

**Regional Cumulative Effects Study for
Drybones Bay and Wool Bay**

prepared for:

**Mackenzie Valley Environmental Impact
Review Board**

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List of Acronyms

ASTIS -	Arctic Science and Technical Information System
CBD	Convention for Biological Diversity
CEA	Cumulative Effects Assessment
CGV	Consolidated Ventures Inc.
COP IV	Conference of Parties
CWS	Canadian Wildlife Service
DAR	Developer's Assessment Report
DFO	Department of Fisheries and Oceans
DIAND	Department of Indian Affairs and Northern Development
EA	Environmental Assessment
GNWT	Government of the Northwest Territories
GSL	Great Slave Lake
IR	Information Requests
LUP	Land Use Permit
MVEIRB	Mackenzie Valley Environmental Impact Review Board
MVLWB	Mackenzie Valley Land and Water Board
MVRMA	Mackenzie Valley Resource Management Act
NAGRC	North American General Resources Corporation
NEOS	formerly known as Networking Edmonton's On-line Systems (a consortium of about 20 libraries in Alberta)
NSV	New Shoshoni Ventures Inc.
NWT	Northwest Territories
RWED	Resources, Wildlife and Economic Development
UNESCO	United Nations
VEC	Valued Environmental Components
WKSGP	West Kitikmeot/Slave Geological Province
YKDFN	Yellowknives Dene First Nation

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1 Introduction

Exploration activity for diamondiferous kimberlite is ongoing in the Drybones Bay and Wool Bay areas. Land Use Permits are required for much of this exploration work, which has resulted in a number of Preliminary Screening referrals of four of these proposed developments¹ from the Mackenzie Valley Land and Water Board (MVLWB) to the Mackenzie Valley Environmental Impact Review Board (MVEIRB, Review Board, or Board) for environmental assessment (EA). These referrals were made based on concerns about potential cumulative effects to the area, *“These concerns related to impacts from mineral exploration to the cultural, social and traditional land use importance that the Drybones and Wool Bay Areas signify to first nations.”*²

The MVEIRB, in the absence of planning instruments for the Drybones Bay and Wool Bay areas, must consider *“the impact of the development on the environment, including the impact of malfunctions or accidents that may occur in connection with the development and any cumulative impact that is likely to result from the development in combination with other developments”* (Mackenzie Valley Resources Management Act (MVRMA), S.117 (2) (a)). The Board must recognize potential land use conflicts that may change magnitude and significance of an impact and provide recommendations to minimize cumulative effects.

The Drybones Bay and Wool Bay areas are recognized as being of vital importance to Aboriginal and non-Aboriginal residents in and around Yellowknife. The referral concerns have highlighted the need for decision-making tools suited to the identification, evaluation and mitigation of potential cumulative effects, particularly in the absence of land use plans for these areas, and to help the MVEIRB to make decisions about potential cumulative effects that provides an understanding of:

- social, cultural and environmental sensitivities in the Drybones Bay and Wool Bay areas;
- level of uncertainty associated with sensitive and/or highly-valued areas;
- current and foreseeable development; and
- an evaluation of the area for potentially significant impacts due to cumulative effects.

¹ **Development** means any undertaking, or any part of an undertaking, that is carried out on land or water (s.111 MVRMA)

² From **Reasons for Decision** reports issued by the MVLWB for the referral of the four developments to the MVEIRB, dated April 11, 2003, April 28, 2003 and May 20, 2003.

1.1 Purpose

The purpose of this project is to develop a decision-making tool to help the MVEIRB make judgements about the contribution the referred developments have to potential cumulative effects, and for the Board to make effective recommendations concerning development in the Drybones Bay and Wool Bay areas.

1.2 Approach

A “*State-of-the-Environment*” report was prepared that outlines existing biophysical, cultural, heritage and archaeological resources found in the study area. It indicated the level of confidence and the level of detail associated with each of these components. This information provided a baseline knowledge framework or context of the study area, which the Review Board will then be able to use to complete its EA and any cumulative effects assessment required of the referred developments. A cumulative effects decision-making tool will also be developed that will enable the Review Board to consider potential effects of multiple developments in areas where little baseline information is available.

1.3 Environmental Assessment Process

The federal government implemented the *Mackenzie Valley Resource Management Act* to allow northerners to participate in the decision-making processes for environmental assessment and natural-resource management. The legislation establishes co-management boards for:

- land use planning;
- issuing land use permits and water licenses; and,
- environmental impact assessment.

The Environmental Impact Assessment process described in the MVRMA has three stages: preliminary screening, environmental assessment and environmental impact review. In the preliminary screening stage, the regulatory authority such as the Land and Water Board decides whether or not there *might* be public concern or adverse environmental impacts because of a development. If the regulatory authority identifies that there might be public concern or significant adverse impact, the development is referred to environmental assessment. In the environmental assessment stage, the Review Board reviews a development description to evaluate the significance of public concern or adverse environmental impact. The third stage, environmental impact review, involves a more rigorous examination of the development description.

Not all developments go through all three stages. Developments associated with greater public concern or potentially significant environmental impacts are most likely to advance to the next stage for more

thorough consideration. Regulatory activities cease while a development is in an environmental assessment or environmental impact review process.

The Drybones/Wool Bay developments (Consolidated Goldwin Ventures, North American General Resources Corporation, New Shoshoni Ventures and Snowfield Development Corporation) have been referred to environmental assessment due to public concern about potential cumulative effects. The Review Board determined there was a need to examine these developments on a sub-regional scale. This approach would allow the Review Board to properly evaluate the public concern (i.e., the reasons for referral), and other matters it is required to consider in an environmental assessment, about this area. The shared access, proximity and the similarity of the developments prompted the joint assessment of these developments to evaluate potential cumulative effects and to identify effective mitigation measures.

1.4 Study Area

A two-tiered study area was developed for this project, consisting of a Regional Study Area and several Local Study Areas. The regional and local study areas are shown in Figure 1.

1.4.1 Regional Study Area

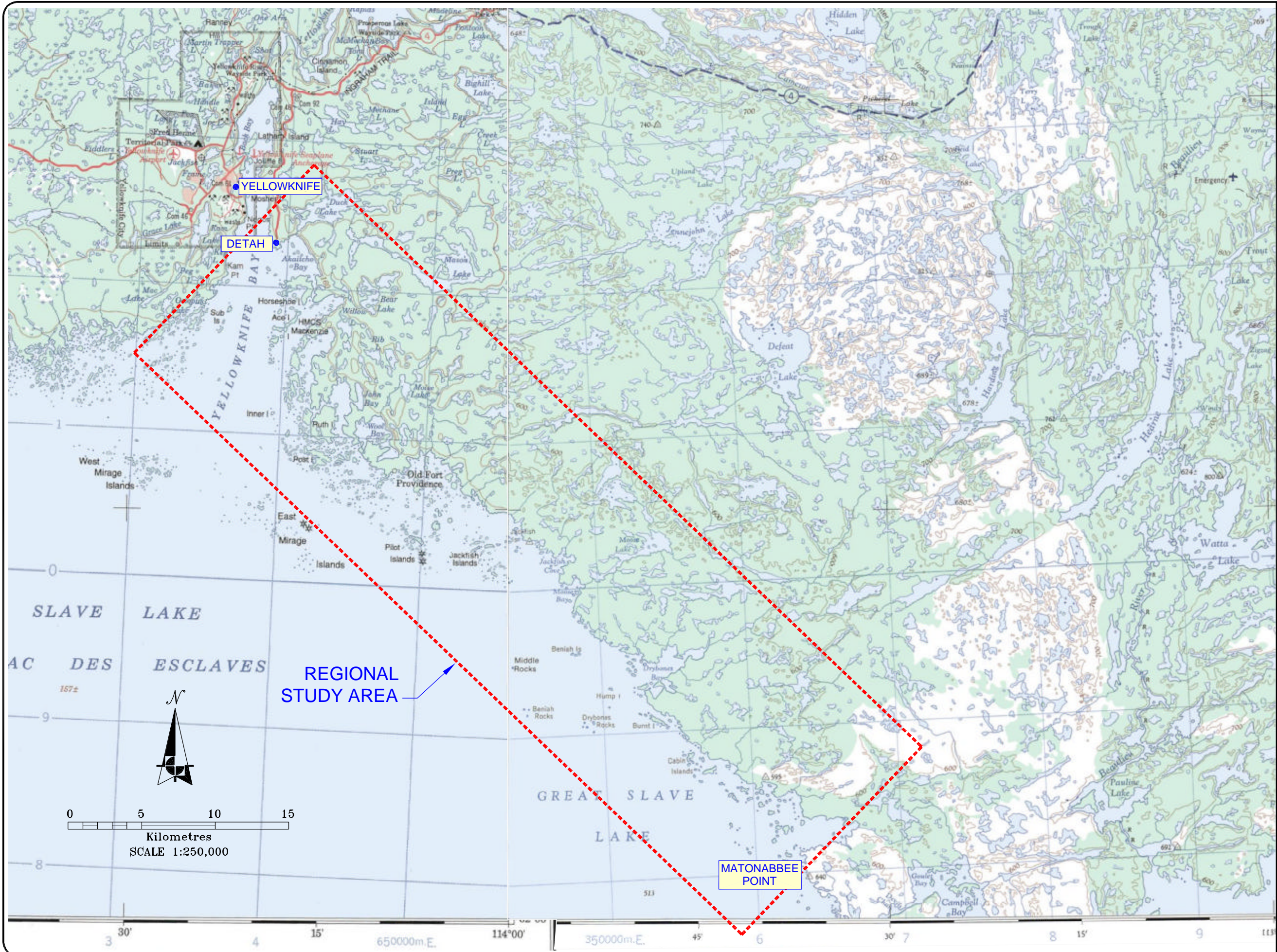
The Regional Study Area extends from the community of Dettah in Yellowknife Bay south and east along the shoreline of Great Slave Lake to Matonabee Point. The areal extent includes 5 km offshore to 10 km inland, an area of approximately 1650 km² (636.9 sq. mi.).

The purpose of defining a Regional Study Area was to establish geographical boundaries for completing the literature search. The findings of the literature search provide a greater understanding of the historical use of the Regional Study Area, and provide the context for determining the importance of the Local Study Areas.

1.4.2 Local Study Areas

There were two Local Study Areas considered in this project:

- the Wool Bay Local Study Area centred on Wool Bay, including the development area South East proposed by North American General Resources Corporation (NAGRC); and,
- the Drybones Bay Local Study Area centred on Drybones Bay, including the development areas (defined by mineral lease boundaries) to the West, South and East proposed by Consolidated Goldwin Ventures Inc. (CGV), New Shoshoni Ventures Inc. (NSV), and Snowfield Development Corporation (Snowfield) respectively.



LEGEND:

SOURCE OF DRAWING:
 GOVERNMENT TOPOGRAPHIC MAPS
 1:250,000 SCALE
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REGIONAL CUMULATIVE EFFECTS STUDY FOR
 DRYBONES BAY AND WOOL BAY
 NORTHWEST TERRITORIES
 MACKENZIE VALLEY ENVIRONMENTAL REVIEW BOARD

REGIONAL STUDY AREA

2 Milestones and Deliverables

The Terms of Reference (Appendix A) for this project required several tasks to be completed:

- Literature review and gap analysis;
- Site visit;
- Gather traditional land use information³;
- Interviews with industry associations and developers;
- Interviews with government departments⁴;
- Design impact decision tool and draft report;
- Refine impact decision tools and report;
- Attendance at Pre-hearing Conference and Public Hearing.

The literature review gathered several types of information about the study area:

- historical information that provided a context for how culturally important these areas were, and an indication of traditional land use patterns;
- biophysical information; and,
- past and current industrial developments in the study area.

The gap analysis identified where information was sparse or missing. Through further research, interviews and the site visit, additional information was gathered to begin to fill the identified gaps.

A “*State-of-the-Environment*” type report was prepared, with associated data confidence levels, that outlined the historical and current land uses, and existing biophysical, cultural, heritage and archaeological resources found in the study areas. The information provided a baseline knowledge framework or context of the Local Study Areas, which the Review Board then used to complete its EA. A cumulative effects decision-making tool was developed to enable the Review Board to consider potential cumulative effects of these developments.

³ map provided by the North Slave Metis Alliance. No time for obtaining information from the Dene mapping project at the time of this draft

⁴ limited to 5 by the terms of the contract

3 Methodology

It was understood in undertaking this project that “time was of the essence” and that there were only “limited funds” available to complete the project. These limiting factors were imposed because four development proposals had been referred to the Review Board for EA. The Review Board had set a schedule for the EA, and it was hoped that this project could be completed within the timeframe set for the EA. The completed report was primarily to assist the Review Board; however, it was understood that the four developers might also benefit from some of the information presented.

The various methodologies followed to complete the assigned tasks are described below.

3.1 Literature Review and Gap Analysis

Given the limiting factors noted above for this project, an appropriate level of effort was given to the literature review and gap analysis. The task was focused on researching a limited number of databases and potential literature sources in order to establish the past and historical use of the Regional Study Area, and to establish the current biophysical setting. This information was then used to help set the context within which to consider the current land use activities and the proposed developments.

3.1.1 Approach

Initial research effort was computer-based using Internet access to public databases such as the Arctic Science and Technical Information System (ASTIS). This approach generated potential sources of material and locations using selected key words. Several subject areas were searched for information relevant to the regional study area:

- historical use;
- biological resources;
- physical resources;
- cultural use; and,
- commercial use.

The source materials were compiled in a list, followed by library access and review of selected documents for relevance. A limited number of documents and web-based sources were accessed by the Internet.

3.1.2 Key Words Applied

The following key words were used in the databases searched:

- drybones bay
- wool bay
- yellowknife bay/back bay
- dettah (also checked spelling of “detah”)
- fort providence (also checked “old fort providence”)
- yellowknives
- dogrib
- akaitcho
- dene
- bathurst caribou
- Great Slave Lake

For some general key words (e.g., dene), and where large number of responses were found (e.g., Great Slave Lake), only a select number of records were examined.

3.1.3 Sources

Three primary databases were accessed using the key words. These primary sources, which are free for public use, are listed below.

3.1.3.1 ASTIS

The Arctic Science and Technology Information System (ASTIS) database contains over 51,000 records describing publications and research projects about northern Canada. ASTIS is maintained by the Arctic Institute of North America at the University of Calgary, and is part of the Canadian Polar Information Network.

The ASTIS database also provided listings of articles published in journals and other reports. The web site is: <http://www.aina.ucalgary.ca/astis/>.

3.1.3.2 University of Calgary

The holdings for the libraries on campus at the University of Calgary were accessed through the “catalogue” key. The web site is: <http://www.ucalgary.ca/library/>.

3.1.3.3 University of Alberta

The holdings for the libraries on campus at the University of Alberta were linked to the Gate catalogue through the NEOS system. NEOS is a central Alberta library consortium of approximately 20 libraries that have collaborated to create and maintain a shared on-line catalogue. The web site is:

<http://dra.library.ualberta.ca/>.

3.1.4 Gap Analysis

The literature search results provided a framework context of the cultural, heritage and biophysical resources of the Regional Study Area. A gap analysis of the results provided an indication where information would have to be gathered from other sources and through the other means described herein.

3.2 Site Visit

3.2.1 Yellowknives Dene First Nation Field Trip

The Yellowknives Dene First Nation (YKDFN) collected information on archaeological and heritage resources of the Drybones Bay and Wool Bay areas from July 14 to 23, 2003. This study was being conducted independently by the YKDFN and was not related to this cumulative effects project. The research by the YKDFN field team (Table 1) was restricted to the shoreline between approximately Matonabee Point and Wool Bay. It was recognized that this information would be useful to the MVEIRB for completing its EA. The YKDFN provided a copy of their draft report, titled “*A Preliminary Report on the Cultural and Historical Resources of the Drybones and Wool Bay Areas, August 18, 2003*” to Gartner Lee and gave permission to use the information in a generalized manner. The information collected still requires registration with the federal government and the receipt of “Borden numbers”⁵ for identified archaeological sites.

As part of the Terms of Reference for this project, the consultant was required to visit the study area during the time the YKDFN were conducting their field study. One member of the Gartner Lee project team, Gordon Stewart, joined the YKDFN field team on July 20 – 22, 2003 as an observer.

⁵ Borden Numbers are issued by the Archaeological Sites Registry Office at the Canadian Museum of Civilization.

Table 1 - Yellowknives Dene First Nation Field Study Team

Team Member	Role
Eddie Sikyea	Elder
Mike Francois	Elder
Modeste Sangris	Elder
Helen Tobie	Elder
Alfred Baillargeon	Elder
Theresa Sangris	Elder
Laurence Goulet	Guide/Reporting (Trip Report)
Morris Martin	Guide
Adeline Mackenzie	Cook
Margaret Martin	Cooks Helper
Callum Thomson	Archaeologist
Randy Freeman	Historical Geographer (Resource Report)

Additional trips were made by some members of the YKDFN Field Study Team from August 5 to 7, 2003 to attempt to locate a previously unrecorded grave site, and again on August 14, 2003 with staff (Megan Wilson, Rebecca Chounard and Shannon Pagotto of Water Resources, and Lional Marcinkoski, Andrea Cole and Miki Promislow of Environment and Conservation) from the Department of Indian Affairs and Northern Development (DIAND).

1

3.2.2 Information Gathering

The archaeological, cultural and heritage importance of the Regional and Local Study Areas was obtained by Gartner Lee through discussions with the elders, other YKDFN field team members, and through visual observations of past and current land uses in these areas. The relative importance of the Regional and Local Study Areas for each of the components considered (e.g., biophysical, cultural, heritage and archaeological) was then indicated and hand-drawn onto 1:50,000 scale topographic maps (NTS 85 J/8 – Yellowknife Bay and 85 I/4 – Matonabee Point). This information was recorded as polygons on the maps.

General observations about the biophysical attributes of these areas, and the biological productivity of aquatic and terrestrial habitats were also made and noted in a similar polygon fashion.

3.3 Gathering Traditional Land Use Information

3.3.1 Information Gathering⁶

Traditional land use information was gathered in three different ways:

- information recorded in existing literature, and identified in the literature search;
- information gathered directly during the site visit from YKDFN elders; and,
- information obtained through direct requests made to the various aboriginal groups that are known to use these areas.

Information gathered and obtained through each of these methods was recorded. It should be noted that owing to the sensitivities surrounding the gathering and use of traditional land use information and traditional knowledge, the client was the first point of contact in making requests, and acted as liaison, to the various aboriginal groups that self-identified themselves as having an interest in the area for the EA.

3.3.2 Information Recording

Traditional land use information is recorded in written text when it was gathered in that form, displayed on maps provided by an aboriginal group, and displayed on the Biophysical Resources and Activities map (please refer to section 3.6 of this report for additional information on the maps accompanying this report). This general depiction method was used to illustrate information considered proprietary, sensitive, or that required special representation (i.e., archaeological information).

3.4 Interviews with Industry Associations and Developers

3.4.1 Information Gathering

Interviews with developers (Table 2) primarily focused on gaining a better understanding of their proposed drilling exploration programs, obtaining better, more accurate descriptions of drill locations and numbers of drill sites, as well as information on other activities (i.e., cut line locations and development potential). This information was requested in order to develop a better “picture” of the drilling programs being planned and a better understanding of the footprint of the projects.

⁶ Note: one potentially major source of information not considered due to time constraints was the Dene Mapping Project where information on traditional land use and occupancy information in the form of trails and activities of hunters and trappers was recorded.

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

No more than 10 interviews with Industry Association representatives and Developers were allowed for in the contract.

Questions included the following areas:

- drill numbers and locations;
- waste disposal including drill waste water and cuttings;
- past activities;
- anticipated activities for this years planned program;
- storage of equipment and access to drill locations;
- type of access to the project sites;
- existence of tent camps; and,
- drilling program methodology and anticipated footprints.

Information requests were also made to Industry Associations and other, non-mining, industry operators (Table 2) that have utilized the Local Study Areas either currently or in the past.

Questions included the following areas:

- intensity and location of past activities in these areas;
- intensity and location of current and known planned activities in these areas; and,
- seasonal and spatial extent of past, present, and known planned activities.

Table 2 – Industry Association and Developer Contacts

Contact Name	Representing
Developers	
Max Braden/Glen McDonald	New Shoshoni Ventures Ltd.
Lori Stephenson	Consolidated Goldwin Ventures Inc.
Fraser Fleming/Mike Beauregard	Snowfield Development Corp.
Paul Cawley	North American General Resources Corp.
N/R	Diamonds North
David Smith	N/R
Industry Associations and Other	
Greg Robertson	Bluefish (Tourism – fishing/boating charters)
N/R	Barbara Ann Charters (Tourism - fishing/boat charters)
N/R	Adventure Northwest Ltd. (Tourism – fishing/boat charters)
N/R	Air Thelon (Tourism - outfitter/ rental)

Contact Name	Representing
N/R	B.S. Boat Rentals and Charters (Tourism - outfitter/ rental)
N/R	Bathurst Inlet Developments Ltd. (Tourism - outfitter/ rental)
N/R	Dechi Laot'I First Nations (Tourism - outfitter/ rental)
N/R	Las La Martre Development Corporation
N/R	Narwal Northern Adventures (Tourism - outfitter/ rental)

N/R = not recorded

3.4.2 Information Recording

Information received in response to these interviews was mapped and recorded in written form. The mapped information was recorded on the Biophysical Resources and Activities map.

3.5 Interviews with Government Departments

3.5.1 Information Gathering

Interviews with government department representatives (Table 3) focused on gathering information about the biological resources of the Drybones Bay and Wool Bay areas, estimated levels of utilization of these resources in these areas, and an indication of the sensitivities of these resources.

No more than 5 interviews with government representatives were allowed for in the contract. However, when required additional interviews were undertaken by the contractor in order to attempt to gather information considered crucial to this project.

Questions included the following areas:

- types and relative abundance of biological resources of the Drybones Bay and Wool Bay areas
- an indication of any species and habitats at risk, or that are endangered
- an indication of the level of utilization/harvesting of biological resources
- sensitive and critical habitats in the areas
- species sensitivities to external development pressures.

Some government departments retain information on the physical attributes of the Drybones Bay and Wool Bay areas, and on the extent of past and current land and mineral leases. As well, some departments have research information related to fate and effects of contaminants and zones of impact resulting from certain physical activities.

Questions included the following areas:

- extent and location of past land and mineral leases
- level and types of physical activities carried out in these areas
- fate and effects information on typical development activities
- estimated footprint, duration and intensity of physical activities

Table 3– Government and Other Contacts

Contact Name	Representing
Federal Government	
Elaine Blais/George Low	Department of Fisheries and Oceans (DFO)
Anne Wilson	Environment Canada
Paul Latour	Canadian Wildlife Service (CWS)
Kenneth Dahl	DIAND – District Office
Rose Greening	DIAND – Mining Recorders Office
Gwenda Luxon/Evangelos (Van) Kirizopoulos	DIAND – IMAG (LIMS database)
Government of the Northwest Territories	
Dean Cluff/Raymond Bourget/Lance Smith	Resources, Wildlife and Economic Development (RWED) – Wildlife Management
Dana Lampie/Tom Andrews	Prince of Wales Northern Heritage Centre
Helmut Epp/Cindy Squires-Taylor	RWED – NWT Centre for Remote Sensing
Susan Corey	RWED – Forest Management
Other	
Bob Wooley/Pearl Liske	MVLWB
Sherry Sian/Alan Ehrlich	MVEIRB

3.5.2 Information Recording

Information received in response to these interviews was recorded on maps, or received as maps, as applicable, as well as in written form. Mineral Claim maps indicating mineral leases, land dispositions and Land Use Permits were obtained for the Local Study Areas (1:50,000 NTS coverage for Matonabee Point and Yellowknife Bay) from DIAND. A Land Cover Classification map was obtained from RWED Forest Management (prepared by NWT Centre for Remote Sensing).

3.6 Design Impact Decision Tool

The impact decision-making tool for considering cumulative effects in the Wool Bay and Drybones Bay areas focussed on the reasons for referral of the development proposals to the MVEIRB, namely, cumulative impacts to social, cultural and traditional land use. This does not mean that potential cumulative effects unrelated to the social and cultural environment do not need considering, only that they were not part of the preparation of this decision-making framework. It can be noted, however, that many of the biological aspects normally considered for cumulative effects are also picked up for social and cultural effects.

In preparing the cumulative effects decision-making framework for the social and cultural environment⁷, the following points were borne in mind:

- the Convention for Biological Diversity⁸ (CBD) and the proposed Convention for Cultural Diversity⁹. It has been noted at the recent Conference of Parties (COP VI) for the CBD that cultural diversity is closely linked to biological diversity and will only be sustained where the biological diversity on which the culture relies is maintained. UNESCO has also recognized cultural diversity in a recent universal declaration. UNESCO maintains that cultural diversity and biodiversity are “interdependent prerequisites for sustainable development¹⁰”; and
- the *Mackenzie Valley Resources Management Act* (MVRMA) and the land claim agreements¹¹ on which it is based, provide essential guidance on the meaning of the social and cultural environment in the definitions for harvesting¹² and heritage resources¹³.

⁷ “*impact on the environment*” means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.

⁸ <http://www.biodiv.org/doc/legal/cbd-en.pdf>

⁹ The pros and cons of this convention can be noted by doing a Google search on “convention on cultural diversity”. This report does not advocate or dispute the proposed convention.

¹⁰ www.iisd.ca/linkages/2002/wssd/enbots/asc/enbots1008e.txt

¹¹ Gwich’in Comprehensive Land Claim Agreement and the Sahtu Dene and Metis Comprehensive Land Claim Agreement.

¹² “*harvesting*” in relation to wildlife, within the context of the MVRMA, means hunting, trapping or fishing activities carried on in conformity with a land claim agreement or, in respect of persons and places not subject to a land claim agreement, carried on pursuant to aboriginal or treaty rights.

¹³ “*heritage resources*,” within the context of the MVRMA, means archaeological or historic sites, burial sites, artifacts and other objects of historical, cultural or religious significance, and historical or cultural records.

3.6.1 Visual Tools

The following resource maps were obtained or prepared:

1. **Land Cover Classification**¹⁴ – indicating land cover (e.g., forest and vegetation types) classes in the Wool Bay and Drybones Bay areas (this map will only be provided to the Review Board and will not accompany the report).
2. **North Slave Metis Alliance Land Use**¹⁵ - indicating past and current traditional harvesting, gathering, fishing and camping locations in the Wool Bay and Drybones Bay areas (Appendix B).
3. **Mineral Claims**¹⁶ – indicating (limited) past and current mineral claims, mineral leases, land dispositions and Land Use Permits in the Wool Bay and Drybones Bay areas (Appendix C).
4. **Biophysical Resources and Activities** – indicating land use and recreational activities, biological resources and use, archaeological/heritage resources, VEC range, and the proposed exploration and development activities related to the four development proposals under investigation (Appendix D).

These resource maps give an indication of the activities and biophysical resources in the Local Study Areas. The visual representation of this information for the Local Study Areas will assist the MVEIRB in its EA.

3.6.1.1 Biophysical Resources and Activities

This map (Appendix E) represents a compilation of site specific information (e.g., the mineral leases and drill locations) and general observations (e.g., from visual assessments and local knowledge). It represents an important tool for visualizing the developments in relation to the biophysical, cultural and archaeological resources identified.

¹⁴ Northwest Territories Land Cover Classification, prepared by NWT Centre for Remote Sensing from the “Northwest Territories Land Cover Classification” digital data provided by Forest Management, RWED.

¹⁵ Recorded North Slave Metis Alliance Land Use of Wool Bay and Drybones Bay Region, prepared by the North Slave Metis Alliance, August 6, 2003 for Gartner Lee Limited and the MVEIRB.

The depiction of this information on the map is described below:

Land Use and Recreational Activities – such as cabins, commercial activities (fish camps and fish plants), recreational activities (boating, anchorage, picnic sites, camp sites), recreational harvesting activities (hunting, fishing, berry picking). Information based on personal observation and local knowledge (level of confidence).

Biological Resources and Use – terrestrial and aquatic resources (habitat, vegetation), habitat use (evidence of animal droppings, trails, nests, prints). Information based on personal observation and local knowledge (level of confidence).

Archaeological/Heritage Resources – indicating heritage and archaeological sites. Information based on information provided by Yellowknives Dene First Nation, North Slave Metis Alliance, and Prince of Wales Northern Heritage Centre. (Note: Point source archaeological information is confidential; polygon representation indicates one or more archaeological points are located within the area.)

Valued Environmental Components (VEC) Range – corresponds to boundaries of Regional Study Area, indicates known range of VECs within the Regional Study Area.

The depiction of “land use and recreational activities” and “biological resources and use” as coloured linear polygons (i.e., coloured lines) represents the level of confidence in the information sources, in this case visual observation and local knowledge. No corroborating site specific or detailed information sources to support the observations or local knowledge gathered is available; therefore, more precise locations of these resources could not be made. What information was obtained on these attributes from the literature search was only general in nature to a much larger region of the NWT than the Regional Study Area for this project. Although this is the case, the Review Board may choose to place whatever level of confidence in this information it deems appropriate for its purposes.

Depiction as linear polygons was considered appropriate for these attributes, as using square or rectangular polygons, as were used for the depiction of “archaeological/heritage resources”, may unintentionally imply a greater level of confidence in the information. For example, using a rectangular polygon to represent biological resources and use (i.e., fish) in the shoreline areas of Drybones Bay would imply a high degree of confidence (i.e., through scientific peer reviewed study, or the collection of specific traditional knowledge) that these areas are important fish habitat; while for the purposes of this

¹⁶ Mineral Claims maps, prepared by DIAND Land Administration, Mining Recorder for 85I4 and 85J8 1:50,000 map base.

report, because such specific studies for Drybones Bay are not available, the general principle that these areas are good fish habitat has been applied, and thus depicted as a linear polygon.

3.6.2 Impact Decision Making Process

The impact decision-making process developed for the Review Board to use in this EA consists of several visual aids or tools in the form of maps, and recommendations on how to consider potential impacts and cumulative impacts from mineral exploration to the cultural, social and traditional land use importance that the Drybones and Wool Bay areas signify to first nations.

The impact decision-making process involves the consideration of the individual and combined (i.e., cumulative) stated and identified effects of the proposed developments on the archaeological, cultural and heritage resources. It is the responsibility of the Review Board, under the authority of the *Mackenzie Valley Resource Management Act*, to complete an environmental assessment and any cumulative effects assessment required, on development proposals referred to it.

3.7 Refining Impact Decision-Making Tool

This step involves the review of comments received on the draft products and revising the documents and products, as appropriate. It is intended to allow the Review Board and parties to the EA to fully understand the information that has been gathered and the decision-making tool that has been developed for its use. Refining and revising the draft products will be limited to correcting information as appropriate, providing clarification of the information provided, and where necessary, facilitating a clearer understanding of the decision-making tool.

If additional information that was previously unavailable to the contractor was to be provided by the Review Board at this point, then the contractor may choose to revisit, refine and review its conclusions based on this additional information.

3.8 Pre-Hearing Conference and Public Hearing

A Pre-Hearing Conference is scheduled to be held in Yellowknife on Thursday, November 6, 2003. The purpose of the Pre-Hearing Conference is to assist the MVEIRB in setting the agenda for the Public Hearing, to explain the hearing process to participants, and to identify issues or concerns to be addressed at the Public Hearing.

A Public Hearing is scheduled to be held in Yellowknife on Tuesday and Wednesday, November 18 – 19, 2003. The purpose of the Public Hearing is to allow the MVEIRB to hear and consider the views of

members of the public, directly affected parties and interveners, and to consider potential socio-economic, environmental and cumulative effects caused by the developments.

3.9 Problems and Constraints

There were several problems and constraints encountered while preparing this report. These were a result of several factors, most importantly:

- limited scope of work;
- changes to the Terms of Reference and project objectives during the work;
- the lack of specific information; and,
- the lack of time to request and collect some of the information.

These constraints resulted in delays in completing this report in accordance with the original (i.e., Terms of Reference) and modified (i.e., Review Board decision) delivery dates. A draft version of this report was placed on the public registry on September 5, 2003 for all parties to the EA to view. A second draft was placed on the Public Registry on September 12, 2003 and a complete final report was provided to the MVEIRB on September 26, 2003.

It is recommended that the Review Board undertake additional research and analysis, particularly of those information sources noted herein as not being accessed, to better refine the cumulative effects decision-making tool, for use in reviewing future applications.

The most critical impediments to this report are discussed below. Information Requests (IRs) are also suggested in order to acquire the additional or outstanding information.

3.9.1 Information Availability

Some of the constraints encountered during this project reflect, in part, on the general availability of information for the Regional and Local Study Areas. These would also have been encountered by all parties to the EA, and in particular by the developers in their search for similar information.

Specific biophysical information has not been collected for the Regional and Local Study Areas. For example, detailed or site specific wildlife studies of the areas have not been completed by the Government of the Northwest Territories (GNWT). The one study pertinent to the Local Study Areas was conducted by RWED for the YKDFN; however, the results were not publicly available for this project and could not be used in this report. In addition, there was no information available about the aquatic productivity of the Drybones Bay and Wool Bay areas, how important these areas are to the fisheries in the Regional Study Area, and how the proposed developments might affect this productivity.

Using information that is of a general nature for the Regional and Local Study Areas for this project will reflect in the confidence levels where it is applied and as a result the overall conclusions.

The West Kitikmeot Slave Study was a regionally based program initiated by government and industry as a result of increased exploration and development activities in the Slave Geological Province to gather baseline biophysical information. No studies funded under this program extended to the shores of Great Slave Lake to include the Regional Study Area for this project. The studies that were completed for projects in the Lac de Gras area in particular, may have provided useful information related to social, cultural and heritage impacts to the YKDFN; however, due to time and budget constraints, this information was not accessed for use in this report.

Information on past activities in the Local Study Areas was not, or could not be collected. The DIAND LIMS data base provided useful information on Land Use Permits, mine leases and mine claims in the Local Study Areas; but, there are limitations to using the LIMS database. The database was created in 1997 and only the pre-1996 files that were still "active" in status were entered. Several permits from the 1980's were recorded (as active) on the maps. Chances are these permits are inactive but the LIMS file has not been updated. Any Land Use Permits that were inactive (and were pre-1996) were not transferred to the LIMS database. These pre-1996 files are also no longer available on Microfiche as this information is only maintained for 7 years.

The Land Use Permits and surface dispositions contained in the LIMS data base and noted on the DIAND maps are not precisely georeferenced in the database, and therefore are not accurately depicted on the maps (e.g., some Land Use Permit points are shown to be located in offshore areas, which is not correct).

Only two sources of cultural use information was acquired for the Local Study Areas. This was information provided by the North Slave Metis Alliance and the Yellowknives Dene First Nation. The Dene Mapping project is another source of additional cultural and heritage information, but due to time constraints for completing the project this information was not accessed.

3.9.2 Limited Time and Access to Information Holders

The terms of the contract for this project only allowed the consultant a limited number of interviews. In most cases, where a contact did not have information, or did not have sufficient information, additional contacts had to be made in order to acquire at least some of the information required to complete this project.

Due to the time constraints imposed on this project, a cut-off date of August 29, 2003 for information to be acquired and received for use in the report was set. Information requested prior to the cut-off date but received after that date was considered.

3.9.3 Developer Information

The accuracy and quality of the original project descriptions submitted with the referred Land Use Permit applications was another constraint. The quality and scale of location maps and complete descriptions of all activities associated with the developments (e.g., location and number of 1 km square grids and cut grid lines associated with the Snowfield development) required several requests for additional information and clarification. Some of this information is still considered outstanding, as upon receipt and analysis of the additional information, more questions were raised that could not be put forward or answered in time to complete this report.

3.9.4 Suggested Information Requests

The following suggested Information Requests are provided as a result of the constraints encountered in completing this report. The information deficiencies identified here may represent additional information that may be pertinent to completing the EA and cumulative effects assessment for the referred development proposals. In this report, there is a reliance on “professional judgement” and “traditional knowledge” to help fill these information gaps, which may be the only viable alternative for completing the EA process in a timely manner.

Suggested information requests, including the recommended sources are as follows:

- Importance of the Regional and Local Study Areas for wildlife and as wildlife habitat, and potential effects of proposed developments on wildlife and wildlife habitat (RWED, GNWT – wildlife; CWS, Environment Canada – birds);
- Importance of the aquatic productivity of the Drybones Bay and Wool Bay areas, how important these areas are to the fisheries in the Regional Study Area, and how the proposed developments, and on going development and activities might affect this productivity (DFO);
- Indication of past activities, level of disturbance, effectiveness of mitigation measures on the Local Study Areas (DIAND – Land Administration/District Office);
- Clarification and specific past and current information on the number and locations of 1km square grids, and spacing and widths of grids lines cut in relation to identified drill locations for the Snowfield development proposal (Snowfield Development Corp.);
- Location of drill site on Beck 4 (F16609) mineral claim for Snowfield development proposal (Snowfield Development Corp.);

- Given the evidence provided during the Snap Lake EA process that there were cumulative impacts to the Bathurst Caribou, provide an indication of the level of disturbance the identified developments and activities in the Regional Study Area may have, on their own and in association with the other activities already happening, or about to happen (i.e., Snap Lake) in the Slave Geological Province, on wintering caribou (RWED, GNWT – wildlife).

4 Regional Cumulative Effects

4.1 The Setting: Land and Water Use In the Wool Bay and Drybones Bay Areas

The information provided in this section demonstrates that the Regional Study Area and surrounding regions have been used by various peoples for a very long time. This information helps to establish the context of land use in the Regional Study Area, it may also convey an indication of the level of disturbance from these activities.

4.1.1 Historical

The first written records of human land and water use in the Wool Bay and Drybones Bay areas were made by the first visiting Europeans. The first European to travel in the vicinity of the Study Area was Samuel Hearne (1771-1772); he recorded Great Slave Lake as “Athapuscow Lake”. On his journey from Fort Prince of Wales (later Fort Churchill) on Hudson’s Bay to the Coppermine River, he encountered several “Copper Indians” (Yellowknife) and a few “Dog-ribbed Indians” on October 23, 1771 (Hearne, 1970:207). A Chipewyan Indian named Matonabee guided Hearne during these travels.

Hearne wrote of Great Slave Lake being “*stored with great quantities of very fine fish*” (Hearne, 1970:248) and described fish species common to this lake as “...*pike, trout, perch, barble, tittameg, and methy; the last two names given by the natives to two species of fish which are found only in this country.*” (Hearne, 1970:249). He added “[*t*]he trout in this lake are of largest size I ever saw: some that were caught by my companions could not, I think, be less than thirty-five or forty pounds weight.” (Hearne, 1970:249).

Hearne described buffalo, moose and beaver “*being very plentiful; and we could discover, in many parts through which we passed, the tracks of martin, foxes, quiquehatches [wolf], and other animals of the furr find; so that they were be no means scarce...*” (Hearne, 1970:250).

After Hearne, Peter Pond and later Alexander Mackenzie visited Great Slave Lake; the latter crossed Yellowknife Bay on June 23, 1789 (Mackenzie, 1970:172). Mackenzie traveled along the north shoreline of Great Slave Lake, eventually following the river later bearing his name to the Arctic Ocean. In the general vicinity of the Study Area, he wrote “... we landed ... a 3 lodges of Redknife Indians <so called from their copper knives> [who] informed us that there were many more lodges of their Friends not far off ...” (Mackenzie, 1970:172).

The surveyor David Thompson makes two references to Great Slave Lake in his Narrative 1784-1812 (Thompson, 1962:57 and 134), while nothing appears extant in his journal regarding the Study Area. In the 1790s, the North West Company founded Fort Providence (herein referred to as “Old Fort Providence”) near Wool Bay. This Fort was a meat-provisioning post “erected for the convenience of Copper [Yellowknife] and Dog-Rib Indians” (Franklin, 1824:325).

The British Officer John Franklin and his party traveled through the Study Area on his first northern expedition (1819-1822). He visited Old Fort Providence, traveled through Yellowknife Bay and ascended the Yellowknife River. The Copper Indian Kescarrah served as Franklin’s guide. About the Study Area he wrote, in part:

[the Yellowknife and Dogrib Indians], who generally bring such a quantity of rein-deer meat that the residents are enabled, out of their superabundance, to send annually some provisions to [another post to the south]. They also occasionally procure moose and buffalo meat, but these animals are not numerous on this side of the lake. Few furs are collected. Les poissons inconnu, trout, pike, carp and white fish are very plentiful, and on these the residents principally subsist. Their great supply of fish is procured through the latter part of September and the beginning of October, but there are a few taken daily in the nets during the winter. The surrounding country consists almost entirely of coarse grained granite, frequently enclosing large masses of reddish feldspar (Franklin, 1824:325-326).

The surgeon-naturalist John Richardson traveling with Franklin wrote of being “at a fishing house, situated at the embouchure of the Yellow knife river” on December 10, 1821 (Richardson, 1984:177). He also wrote on December 14, 1821 of being at Old Fort Providence “when Akaicho [Akaitcho, the Yellowknife leader] with his whole band came to the Fort in the afternoon.” (Richardson, 1984:178). He recorded Akaitcho’s conference with Captain Franklin.

Franklin’s midshipman Robert Hood wrote “[t]he people subsist on reindeer [caribou] and moose deer, which are brought by the Copper and Dogrib Indians” (Hood, 1994:135). He added the fish “common to every part of the lake are Poisson Inconnu, trouts, pikes, carps and whitefish” (Hood, 1994:136). Hood went on to describe this area as “[t]he whole north border and the islands of granite rocks, with no other soil than the roots of moss. The trees are stunted pines, poplars and birches, with rose and red currant bushes” (Hood, 1994:136).

Franklin's midshipman George Back recorded leaving Old Fort Providence on August 2, 1820, enroute north through Yellowknife Bay. He also wrote of visiting Old Fort Providence in the winter (March 1821) and described this place "of all others the most solitary and annoying. Inconveniently situated at the base of a rock which scantily supplies sufficient earth for the vegetation of a few shrubs – and overlooked by high hills on each side whose sterility was such as scarcely to provide sufficient fuel for the fort." (Back, 1994:115).

Old Fort Providence closed in 1823 following the consolidation of the North West Company and the Hudson's Bay Company (Gillespie, 1981:286).

4.1.2 Adventurers-Travelers Accounts

The naturalist Frank Russell travelled from Fort Rae through Yellowknife Bay, to ascend the Yellowknife River, in the period of 1892-1894. He collected specimens on Dogrib material culture under the auspices of the University of Iowa. His account does not present any notable observation of the Regional Study Area (Russell, 1898).

Other early travellers' (e.g., Pike, 1917) accounts, who visited Great Slave Lake, were examined; however, the accounts reviewed were not relevant for the Regional Study Area.

4.1.3 Present Day

Both Wool Bay and Drybones Bay lie within traditional territory of the Northern Athapaskan people (i.e., Yellowknives (Figure 2), Dogrib, and Chipewyan). It is also within territory of the North Slave Metis. It is geographically part of the West Kitikmeot/ Slave Geological Province (WKSGP). The communities nearest to the regional study area are Dettah and Yellowknife.

At the time of contact, the lives of the Yellowknives (approx. 430) and Dogrib (approx. 2000) revolved around the movements of the Bathurst caribou, their territories defined by the caribou migration route. Caribou were the primary source of food, shelter and clothing. With the arrival of Europeans, came the fur trade and a gradual change in the original lifestyle. The Yellowknives, Dogrib and Chipewyan (Dene) became trappers trading with the Europeans. By the 1800s, the lives of the traders and the Dene became highly interdependent. The Dene relied on the Europeans for guns, ammunitions, axes, flour, clothing and an assortment of European products. The traders on the other hand needed the Dene for caribou, muskoxen and other country foods and furs. The Dene, however, recognized that the possibility existed that too much trapping and not enough provisioning to survive the winter could mean starvation.

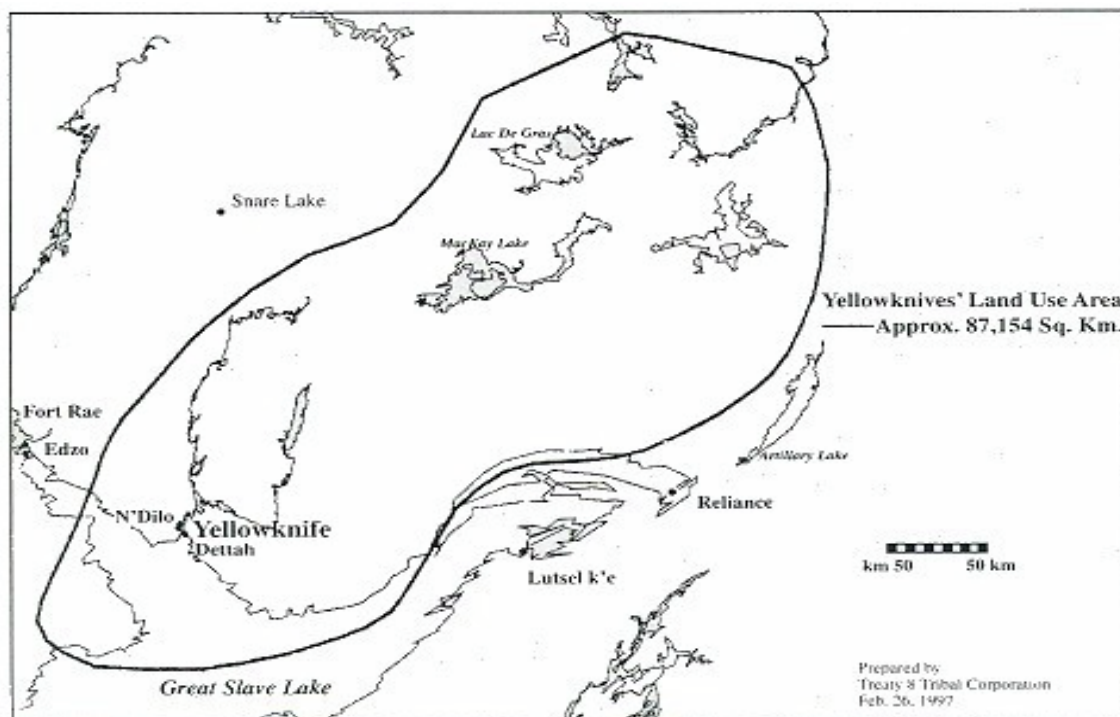


Figure 2. Yellowknives Land Use Area¹⁷.

Since first contact, the lives of First Nations who inhabited the Wool Bay and Drybones Bay area have changed substantially. These changes to the pre-contact way of life have been documented by Sly et. al. (2001), Berger (1977) and Smith (1977). The following is a summary of changes that have taken place.

By the start of the 1900s, the lifestyle of the Dene was going through a significant change. Interest in furs was diminishing, game was in short supply, and the Hudson Bay Company on whom they had relied ceased to provide help with the establishment of the Government of Canada. They were in great risk of famine.

The Government of Canada originally did not have a big interest in northern Canada until oil and gold were discovered. Then, to fulfil its desire to maintain sovereignty, the Government of Canada entered into Treaty 8 and 11. The treaties were to ensure the Dene continued hunting, fishing and trapping (traditional lifestyle) but in time these rights were restricted by a variety of new wildlife protection legislation. During the first 30 years of the 20th century, the Dene were affected by starvation, sickness and disease which altered families, their skill on the land and their knowledge and social organization. Added to this, was the introduction of residential schools and the removal of children from their families

¹⁷ Source: www.ykdene.com

for years at a time. By the 1950s, the Dene had moved into a wage economy and settled into permanent communities.

The changes to the lives of the Dene in the past 50 years has been summarized by Abele (1989).

“One factor of overriding importance is the rate of change in the North, especially since World War II. Each successive generation of Native people has grown up in very different circumstances. For example, elders alive today remember a childhood in which very occasional wage labour and the fur trade were the only significant sources of cash income, while most people made their living mainly from the land. The next generation - people who are in their thirties and forties now - remember being taken from their communities to residential schools for long periods of time and trying to learn the language and skills of their parents despite this. The children of the 1980's attend school (at least until high school) in their own communities, or they may be growing up in cities and large towns. They watch television, listen to popular music and face many different obstacles to learning about their heritage. The contrasts among the childhood experiences of these three generations illustrate the pace of change.”

Today, the Dene and Metis are largely integrated into a wage economy. Participation in “traditional” lifestyles (i.e., trapping) by individuals over the age of 15 in Yellowknife and Dettah is 1.5% (GNWT 2002)¹⁸. Also indicative of change is the use of aboriginal languages. In Yellowknife and Dettah, the number of aboriginal persons who speak an aboriginal language has been in decline over the past decade and is most prevalent in the elderly (Table 4).

Table 4 Aboriginal persons in Yellowknife and Dettah who can speak an Aboriginal Language (adapted from GNWT 2002).

Age Class	Percentage of Aboriginal Persons who can speak an Aboriginal Language		
	1999	1994	1989
15-24 years	10.0	11.6	16.0
25-45 years	20.9	34.7	45.4
45-59 years	34.4	46.8	26.1
60 years and over	73.5	70.0	88.0

On August 25, 2003 the Tlicho Land Claim and Self-Government Agreement was signed, between the Dogrib (Treaty 11) of Rae and the federal government. The Yellowknives (Treaty 8) are still in the process of negotiating with the federal government.

¹⁸ This reference is unclear about whether the Yellowknife population includes the non-aboriginal population.

In the past century, the north shore of Great Slave Lake and the Slave Geological Province in general have undergone transformation. Currently, the area hosts:

- exploration activities and mining - gold and diamond - active and abandoned;
- hydro development;
- an assortment of cabins, outfitting camps, and tourist lodges;
- residential and non-residential hunting, fishing and trapping;
- roads, airstrips and other infrastructure; and
- 2 major communities with half the NWT population.

Since the diamond rush of the early 1990s, there is not a location in the Drybones Bay area that is not staked for exploration.

4.1.4 Heritage Resources: Archaeology

Prior to this summer, only six (6) archaeological sites had received Borden numbers in the Wool Bay and Drybones Bay areas. These were:

- 1 grave site;
- 1 cemetery;
- Michael Drybones cabin;
- Old Fort Providence;
- a single foiled projectile point; and
- the remains of a cabin (pers. comm. D. Lampi, Prince of Wales Northern Heritage Museum).

In July 2003, the Yellowknives Dene undertook a two-week survey for archaeological and historical resources along the shore of Great Slave Lake and adjoining islands. Sixty-four pre- and post-contact artifacts were located (Table 5). Included among the findings were tent rings, cabins, and cemeteries/gravesites.

Table 5. Summary of Archaeological Features Identified in *A Preliminary Report on the Cultural and Historical Resources of the Drybones and Wool Bay Areas* (Draft, August 18, 2003) prepared by Land and Environment, Yellowknives Dene First Nation

General Location	No. of Sites	Resource Site Descriptions
Jackfish Cove	3	<ul style="list-style-type: none"> • 1 cabin site • 1 grave site • 1 tent site
Moose Bay	3	<ul style="list-style-type: none"> • 1 sunken boat site • 1 tent ring site

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

General Location	No. of Sites	Resource Site Descriptions
Drybones Bay	35	<ul style="list-style-type: none"> • 1 commercial fishing camp site • 7 cabin sites (3 old, 4 modern) • 4 camp sites (2 old, 2 modern) • 1 cairn site • 1 possible canoe manufacturing site (canoe weights?) • 2 cemetery sites • 1 clay chimney site / mission site? • 1 commercial fishing camp? • 1 cross site? • 1 drill site • 1 hide-drying/stretching site • 1 quarry site • 1 quarry and shelter site • 1 quarry and work stations • 6 tent sites (some with other boulder features) • 1 tent site and survey marker • 3 tent and quarry site (some with other boulder features) • 1 canoe building site and tent site • 1 boulder alignment site (possibly toboggan or support for hunting blinds)
Burnt Island	5	<ul style="list-style-type: none"> • 4 tent sites • 1 Exploration camp (east of Burnt Island)
Cabin Islands	5	<ul style="list-style-type: none"> • 1 modern cabin site • 1 cemetery site • 1 boulder feature site (possibly tent outline or moose hide-stretching circles) • 1 village site (several cabins) • 1 isolated find: white quartz scraper
North of Matonabee Point	3	<ul style="list-style-type: none"> • 1 cabin site (3 cabins) • 1 cabin and tent site (1 cabin, 3 tent outlines) • 1 tent site
Old Fort Providence	3	<ul style="list-style-type: none"> • 1 grave site • 2 canoe building sites? (one is possibly tent site)
Wool Bay	11	<ul style="list-style-type: none"> • 1 tool-making site • 1 canoe building site • 1 prospector's cairn and work areas

General Location	No. of Sites	Resource Site Descriptions
		<ul style="list-style-type: none"> • 1 mission site • 1 cemetery site • 6 tent sites
Total	68 sites¹⁹	

4.2 The Setting: Land, Water and Climate

4.2.1 Geology

The bedrock of the Regional Study Area constitutes part of a stable cratonic core known as the Canadian Shield (Wolfe, 1998:5). Great Slave Lake straddles the boundary of the Canadian Shield and the Interior Platform (Hoffman *et al.*, 1972:1).

The Study Area is located within the Slave Structural Province. The Slave Province consists of weakly north-trending synclinal belts of Archean supracrustal rocks in the Yellowknife Supergroup (Hoffman *et al.*, 1972:1) - Archean rocks underlie about 60 percent of the Slave Province (McGlynn *et al.*, 1972:1). The oldest supracrustal rocks in this Province are Archean basic (i.e., sedimentary rocks known as granitic batholiths) containing pyroclastics, greywacke and shale (McGlynn *et al.*, 1972:1). These rocks are about 2.5 to 2.7 billion years old (Wolfe, 1998:8). The Study Area is shown on one map as Archean supracrustal batholiths (Hoffman *et al.*, 1972).

Volcanic rocks occur as discontinuous belts along the margin of the Archean complexes (McGlynn *et al.*, 1972:1). Along Yellowknife Bay volcanic rocks consisting of massive basalts and metamorphosed sedimentary rocks called greenstones occur (Wolfe, 1998:8).

Within the Study Area (i.e., vicinity of Akaitcho Bay), the general geology is shown as Burwash Formation (greywacke, slate) on north and east side, while Plutonic Intrusives are located on the east side (McGlynn *et al.*, 1972:see Fig. 4). Horseshoe Island (i.e., south of Akaitcho Bay) is in the Duck Formation (intermediate volcanics), while further south towards Wool Bay are Plutonic Intrusives. The Akaitcho Fault and Hay Fault are located on this region (McGlynn *et al.*, 1972:see fig. 4). Glaciation has stripped overburden from the uniformly resistant Archean granite (Hoffman *et al.*, 1972:3).

¹⁹ This includes the 6 sites previously identified.

4.2.2 Soils

No specific information was located on this subject for the Regional Study Area. It is known that the ecoregion is dominated by Dystric Brunisols with Turbic Cryosols on permanently frozen sites and Organic Cryosols in poorly drained, peat-filled depressions²⁰.

4.2.3 Permafrost

The Study Area's physiographic region is located in the Interior Plains (Brown, 1970). In the NWT, the Interior Plains have widespread discontinuous permafrost. In this discontinuous zone, frozen and unfrozen (known as taliks) layers occur together and, in the southern fringe of this zone, permafrost is found in scattered pockets or islands ranging in size (Brown, 1970:8-9). In Yellowknife the thickness of permafrost is 200-300 ft. [60-90 m.] (Brown, 1970:10). Permafrost occurrence in the Regional Study Area is highly variable depending on the ground conditions (Wolfe, 1998:15).

4.2.4 Hydrology

Great Slave Lake is ice covered during five to six months of each year (Sirois *et al.*, 1995:9-10). At the end of May, most large bays are clear of ice, and large leads have developed offshore. Most of Great Slave Lake remains ice covered until June (Sirois *et al.*, 1995:10). Ice commonly appears in shallow bays and protected near shore areas by mid-October; the large bays are usually ice-bound by early November (Sirois *et al.*, 1995:19; also see Figure 3 for ice break-up patterns in 1991-1992). Drybones Bay has an extensive network of shallow bays and may begin freezing earlier in the autumn than the deeper Wool Bay

Great Slave Lake is largely oligotrophic (e.g., low inorganic nutrients), and the large inflow of mineral-laden water from Slave River accounts for 80-90% of the flows into this lake. This inflow has an important moderating effect on the lake's oligotrophy (Sirois *et al.*, 1995:10). Fluctuations in water levels do not usually exceed 50 cm annually, especially since the construction of the Bennett Dam in British Columbia (Sirois *et al.*, 1995:10).

4.2.5 Climate

The Regional and Local Study Areas are affected by a continental subarctic climate (Wolfe, 1998:8). This climate is dominated by Arctic air masses in winter and spring. The mean annual air temperature is -5.2°C (Wolfe, 1998:8). Precipitation averages about 270 mm, with more than half falling as rain (Wolfe, 1998:8).

²⁰ Source: www.ec.gc.ca

4.3 The Setting: Plants, Wildlife and Fish

4.3.1 Terrestrial Ecozone

The Regional Study Area is located in the Tazin Lake Upland Ecoregion (Figure 3) within the Western Taiga Shield. The Tazin Lake Upland Ecoregion is described below.

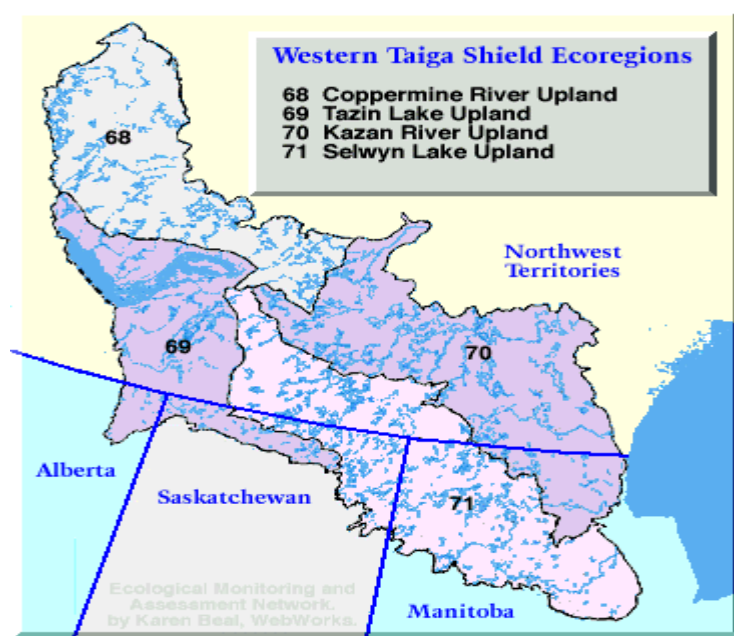


Figure 3. Ecoregions of the Western Taiga Shield ecozone

Tazin Lake Upland

This ecoregion stretches north from Lake Athabasca to beyond the east arm of Great Slave Lake. It is marked by cool summers and very cold winters, and has a subhumid, high boreal ecoclimate. The mean annual temperature is approximately -5°C . The mean summer temperature is 11°C and the mean winter temperature is -21.5°C . The mean annual precipitation ranges 200-375 mm. Yellowknife, on the north shore of Great Slave Lake, has the lowest mean annual temperature of all Canadian cities (-5°C) and the lowest average nighttime winter temperature (-30°C). Vegetation in the ecoregion is characterized by medium to tall, closed stands of trembling aspen and balsam poplar with white spruce, balsam fir, and black spruce occurring in late successional stages. Poorly drained fens and bogs are covered with low, open stands of tamarack and black spruce and have localized permafrost. North of the East Arm Hills, and in the southern one-third of the ecoregion, ridged to hummocky crystalline bedrock forms broad, steeply

sloping terrain. The East Arm Hills, formed of down-faulted and folded, differentially eroded sediments and gabbro sills, dip southerly, forming broad cuestas as much as 275 m above Great Slave Lake, the surface of which is about 150 m ASL in elevation. The intervening valleys are flooded by arms of Great Slave and other lakes. Upland elevations are dominated by bedrock exposures with discontinuous veneers of sandy till, whereas the lowlands are covered by level to gently undulating organic deposits. The ecoregion contains numerous small lakes, often linked by fast-flowing streams that eventually drain into Great Slave Lake. Strongly glaciated rock outcrops are common, and Dystric Brunisols are the dominant soils. Significant inclusions are Turbic Cryosols on permanently frozen sites and Organic Cryosols in poorly drained, peat-filled depressions. Permafrost is extensive and discontinuous with low ice content and sparse ice wedges throughout most of the ecoregion, with the exception of the west side between Lake Athabasca and Great Slave Lake towards the Slave River. Wildlife includes moose, black bear, woodland caribou, wolf, beaver, muskrat, snowshoe hare, and spruce grouse. Land uses include limited local sawlog forestry, outdoor recreation, wildlife trapping and hunting, and fishing. Major communities include Yellowknife, Uranium City, Reliance, Rae, Edzo, and Fort Chipewyan. The population of the ecoregion is approximately 18,100.²¹

4.3.2 Plants

Terrestrial plants

No literature sources were located in the ASTIS or other data bases searched on vegetation studies specific to the Regional Study Area. Plant species found in the ecoregion that correspond to the Regional Study Area include Black spruce (*Picea mariana*), Jack pine (*Pinus banksiana*), Tamarack (*Larix laricina*), Creeping juniper (*Juniperus horizontalis*), sedges (*Cyperaceae*) and Green alder (*Alnus crispa*) (Milburn, 2002; Porsild *et al.*, 1980:3).

The Forest Management Division of RWED has satellite imagery of Land Cover Classification for portions of the NWT. The portion of this data that included the Local Study Areas has been acquired and is included with this report as one of the visual tools (Appendix B).

Aquatic plants

The littoral zone of Yellowknife-Back Bay has submerged macrophytes distributed discontinuously and at variable densities (Jackson *et al.*, 1996:117). Emergent plants, such as *Equistem* species and sedges, are common at the shoreline, but sometimes extend extensively into the littoral zone (Jackson *et al.*, 1996:117).

²¹ Source: <http://www.ec.gc.ca/>

No specific information was found regarding aquatic plants for the Regional and Local Study Areas.

4.3.3 Fauna: Mammals

Caribou

The Bathurst Caribou herd have a large annual range, which includes the Regional Study Area for this project. The typical winter distribution (November to March) of the Bathurst Caribou herd is south of the tree line and includes the Study Area, while the typical summer distribution (June to mid-August) is mostly in Nunavut where calving takes place (Hall, 1989:110) (Figure 4).

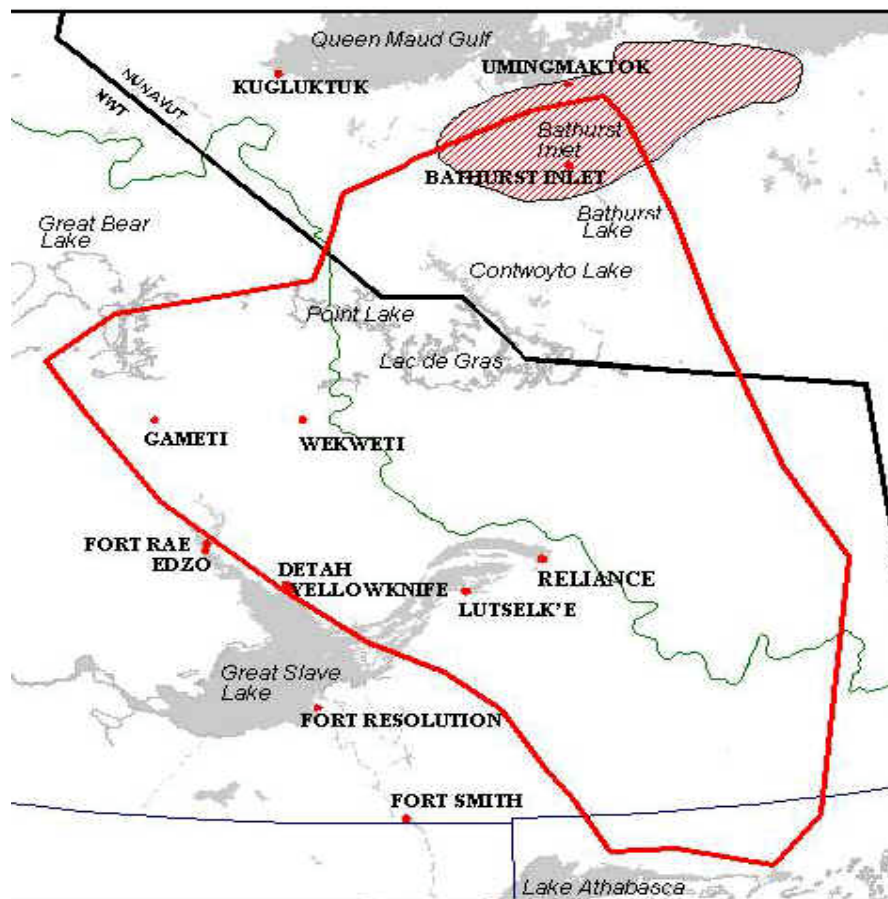


Figure 4 Red outlined area shows study area and annual range of the Bathurst caribou herd based on satellite collar data April 1996-December 2000. Red hatched area: historical calving area 1966-1996²².

In 1990, herd size was estimated at 352,000 caribou aged one year and older (Case et al, 1996).

²² Source: <http://www.nwtwildlife.rwed.gov.nt.ca/>.

Moose

Little specific literature related to the presence of moose in the Regional Study Area is available. However, anecdotal local knowledge on the presence of moose has been collected by the North Slave Metis Alliance (Appendix B). Also, the YKDFN study team investigating archaeological sites in the Regional Study Area indicated that there was good moose hunting all along the north shore of Great Slave Lake. During the field trip to the Regional Study Area, moose sign was very abundant all along the shoreline and the islands that were visited. No population data is available though density estimates for Northwest Territories are 3-17 individuals per 100 km². In all of the NWT, the total moose population is estimated to be 20,000. Moose are at the northern limits of their range in the NWT²³.

Furbearers

No specific literature located on this subject for the Regional Study Area.

4.3.4 Fauna: Birds

For the Yellowknife area (i.e., 75 km radius), one regional checklist includes 184 species (Bromley *et al.*). Within 50 km of Great Slave Lake, there are 237 confirmed species (Sirois, 1994:29).

Nesting colonial waterbirds are abundant along the east shore of Great Slave Lake's North Arm. Three reasons are ascribed for this abundance: (i) the presence of countless small, poorly vegetated or unvegetated islands; (ii) the occurrence of vast wetlands and shallows (between islands and inshore) teeming with invertebrates and small fish; and (iii) turbid and shallow waters that are ice-free relatively early in the spring (particularly attractive to Common Terns and Ring-billed Gulls) (Sirois *et al.*, 1995:26).

West of the Regional Study Area are the East Mirage Islands that are rated amongst the twenty largest nesting sites on Great Slave Lake (Sirois *et al.*, 1995:28). East Mirage Island (#1) had 154 nests in 1989, while East Mirage Island (#2) had 95 nests in 1987 (Sirois *et al.*, 1995:28). The following waterbirds have been reported in the Study Area:

- Parasitic Jaegers (confirmed nesters and probable nester sites)
- Bonapartes' Gulls (confirmed nesters and probable nester sites)
- Mew Gulls (confirmed nesters and probable nester sites)
- Ring-bill Gulls (confirmed nesters and probable nester sites)
- Herring Gulls (confirmed nesters and probable nester sites)
- Caspian Terns (confirmed nesters and probable nester sites)

²³ Source: <http://www.nwtwildlife.rwed.gov.nt.ca/NWTwildlife/moose/wildlifesketch/status.htm>

- Common Terns (confirmed nesters sites)
- Arctic Terns (confirmed nesters sites)
- Black Terns (fledged young-of-year) (Sirois *et al.*, 1995:Fig. 5-8, 10-12, 14, 31)

Seven species of colonial waterbirds that occur on Great Slave Lake are at, or near, the northern limits of their Nearctic breeding ranges and, as such, provide an excellent opportunity to monitor climate change trends. These waterbirds that occupy high trophic levels and bioaccumulate contaminants are potentially important bioindicators of contamination (Sirois *et al.*, 1995:29).

4.3.5 Fish

Great Slave Lake is located in the Arctic drainage basin; the drainage basin is home to approximately 55 species of fish (Scott *et al.*, 1973), while Great Slave Lake contains at least 25 species (Keleher, 1972). Commercial fishing began on Great Slave Lake in 1945. Almost the entire lake has been open to commercial fishing at some point in the history of the fishery; however certain areas have been closed to protect subsistence and sport fisheries. The commercial portion of Great Slave Lake is divided into six (6) administrative areas for management purposes (Figure 5; Read and Taptuna, 2003). The Drybones Bay and Wool Bay areas fall into Area IV.

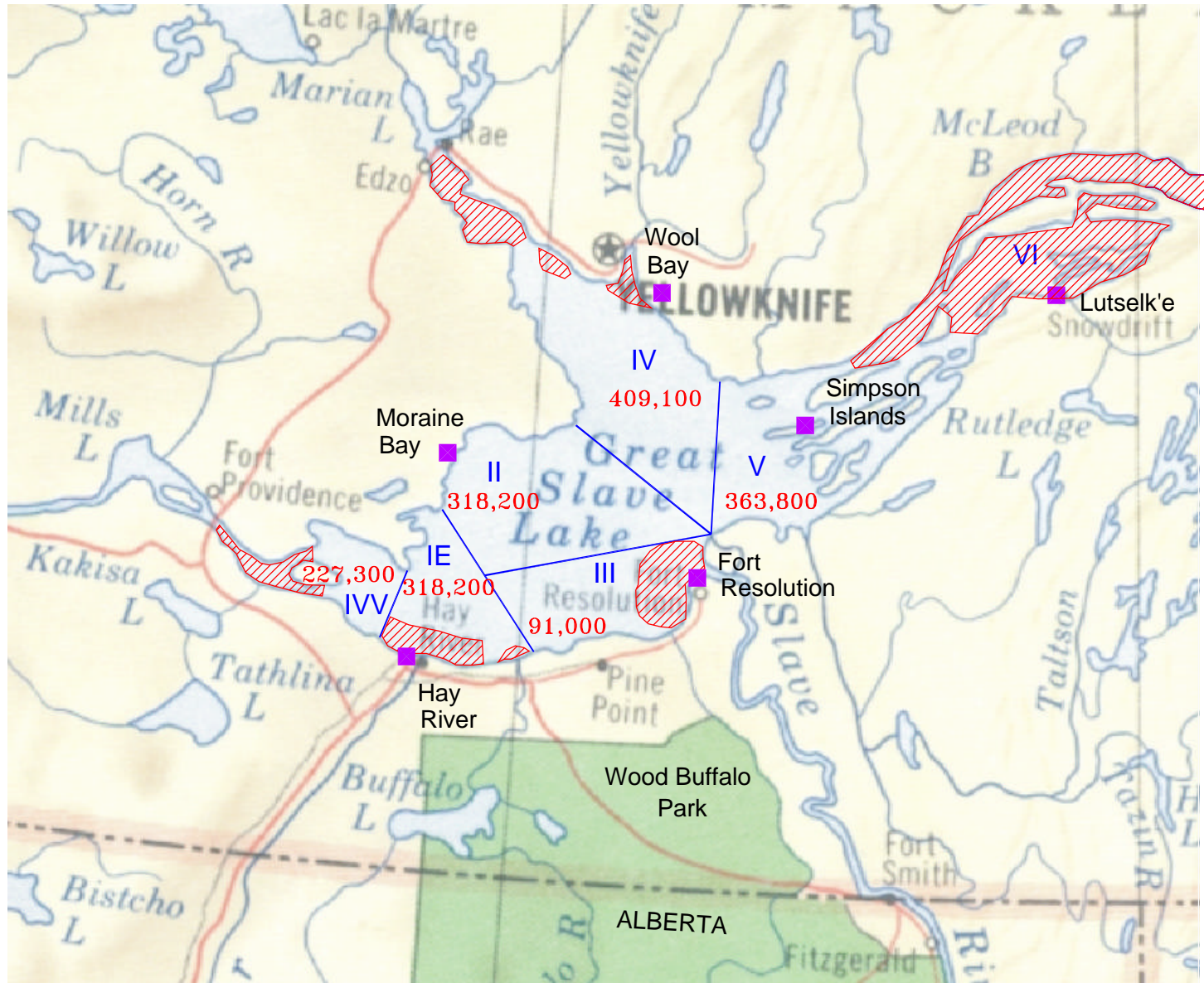
This report documents production values, and age, weight, and length composition based on fish plant sampling carried out for three years: 1999/00, 2000/01 and 2001/02. The report considered the following commercial fish species: lake whitefish (*Coregonus clupeaformis*), lake trout (*Salvelinus namaycush*), inconnu (*Stenodus leucichthys nelma*), northern pike (*Esox lucius*), walleye (*Stizostedion vitreum vitreum*), burbot (*Lota lota*) and longnose sucker (*Catostomus catostomus*). The first five (5) species listed are considered commercially important and are listed in decreasing order of importance.

The commercial quotas²⁴ for Area IV during the 1975/76 to 2001/02 seasons were 622,727 kg (round weight) for 1975-76, 409,091 kg (round weight) for 1976-80, and 409,100 kg (round weight) for 1980-2002. The total production of commercial fish species in Area IV for the years 1999/00, 2000/01, 2001/02 were 353,846 kg (round weight), 399,862 kg (round weight) and 313,633 kg (round weight) respectively. The production values in Area IV were the highest of the six administrative areas for 1999/00 and 2000/01 and the second highest for 2001/02. Note that the production values do not include an estimate of the deteriorated whitefish discarded on the lake, but the values do include whitefish culls at the fish plant.

²⁴ Quotas based on whitefish only and other species caught are considered by-catch

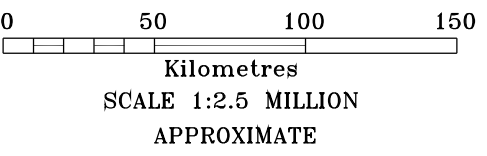
Regional Cumulative Effects Study: Drybones Bay and Wool Bay

DFO has indicated, “The Yellowknife Bay area of the Regional Study Area is considered to be extremely important habitat for a variety of species, year round. The diverse habitat between islands provides spawning habitat for fall spawners such as lake whitefish, lake trout and cisco and for spring spawners such as northern pike, and possibly walleye and other species. The area is also important as a rearing area for fry and fingerlings and immature fish, and a feeding and overwintering area for numerous species.” (George Low, personal communication).



LEGEND:

- FISH PLANT
- ▽ II ADMINISTRATIVE AREA
- 318,200 QUOTA FOR THE COMMERCIAL GILLNET FISHERY
- ▨ AREA CLOSED TO COMMERCIAL FISHING



SOURCE OF MAP:
UNPUBLISHED REPORT BY THE DEPARTMENT OF FISHERIES AND OCEANS, CENTRAL AND ARCTIC REGION.

DRAWING INFORMATION:	
REVIEWED BY:	WJ
DRAWN BY:	CPW
DATE ISSUED:	SEPTEMBER, 2003
PROJECT NUMBER:	23-546
FILE NAME:	23546-1D-01.DWG
REVISION:	0

REGIONAL CUMULATIVE EFFECTS STUDY FOR DRYBONES BAY AND WOOL BAY
NORTHWEST TERRITORIES
MACKENZIE VALLEY ENVIRONMENTAL REVIEW BOARD

COMMERCIAL FISHERY ADMINISTRATIVE AREAS

Gartner Lee

FIGURE NO. **5**

4.4 Valued Environmental Component Identification

In setting the context for the analysis of potential cumulative effects potentially caused by the proposed developments, the focus was on the reasons for referral:

- those biological resources of social and cultural value (i.e., those resources that help maintain cultural diversity);
- heritage resources because of their contribution to culture and society; and,
- spiritual areas.

Spiritual areas included as the Dene perspective, is that land is the primary repository of culture (Hanks, 1997).

Several options are available to consider regional cumulative effects (Axys Environmental Consulting 2000). In this situation, given the concern for the social and cultural environment, it was decided to focus on those biological, social, and cultural resources most likely to be affected by any development, then managing for the likely impacts on that resource at a regional level. While this approach does not have the advantage of a land use plan, it does allow for managing effects of projects on a regional level if proposed projects are allowed to proceed. Land use plans have the advantage where they have the capacity to direct land use before any development is allowed to proceed.

For the purposes of this exercise, valued environmental components (VEC) were selected according to the following questions:

- What are the social, cultural, and environmental sensitivities (i.e., VECs in the Drybones Bay and Wool Bay areas)?
- Which VECs have a regional aspect to them?
- What is the level of uncertainty associated with sensitive and/or highly-valued areas?
- To what extent will access to these resources be affected by multiple land use activities?

4.4.1 Social, Cultural and Environmental Sensitivities (VEC descriptions)

The environmental (biological) components that also reflect on the social and cultural environment are those associated with hunting, trapping, and fishing²⁵. For the Regional Study Area, this includes caribou, moose, furbearers, waterfowl, and fish. To this list can be added, the equally important social and cultural components of plants used for food, medicine, shelter and tools.

Tables 6 – 13 describe the VECs in terms of their social and cultural importance, and uncertainties presently associated with them.

Table 6. Bathurst Caribou

Social and cultural value	Food, clothing, shelter
Habitat use	Uses north shore of Great Slave Lake and Northern Alberta during winter.
Exposure	Winter roads, hunting – commercial hunt camps and private hunting, mines, exploration activities, tree removal
Uncertainty ²⁶ - wildlife	The degree to which other projects and activities affect the behaviour across the entire length of the migratory path.
Uncertainty ²⁶ - human	Interference with cultural use of the land as in loss of access to resource is unknown. It is not known how many people use the area for hunting and how many caribou are taken as a result.

²⁵ See definition of harvesting under the MVRMA.

Table 7. Moose

Social and cultural value	Food, clothing
Habitat use	Islands in Drybones area used for birthing. Found year-round inland from Great Slave Lake in wetland areas. Prime moose habitat known to be at Wool Bay and Moose Bay.
Exposure	Winter roads, hunting – commercial hunt camps and private hunting, mines, exploration activities, tree removal, boat traffic
Uncertainty – wildlife	There are no population estimates for the regional study area. Sensitive to removal of forest cover ²⁷ .
Uncertainty - human	Interference with cultural use of the land as in loss of access to resource is unknown. It is not known how many people use the area for hunting and how many moose are taken as a result.

Table 8. Furbearers²⁸

Social and cultural value	Clothing, income
Habitat use	Unknown for the area.
Exposure	Trapping, habitat fragmentation, loss of prey species.
Uncertainty – wildlife	No population estimates for the regional study area. No information on habitat use in the area, preferential or otherwise.
Uncertainty – human	Interference with cultural use of the land as in loss of access to resource is unknown. It is not known how many people use the area for trapping and how many furbearers are taken as a result.

²⁶ Uncertainty refers to information that missing and would be useful to understanding the effects of development. For example, it is not known if hunters and trappers will have to travel further to undertake traditional activities.

²⁷ Source: <http://www.nwtwildlife.rwed.gov.nt.ca/NWTwildlife/moose/wildlifesketch/status.htm>

²⁸ Includes beaver, muskrat, lynx, wolverine, marten, mink, otters, black bears, and wolves.

Table 9. Waterfowl

Social and cultural value	Food
Habitat use	Shoreline and wetlands for breeding, nesting, rearing and feeding.
Exposure	Boat traffic, hunting, habitat removal, disturbance at breeding/nesting time.
Uncertainty – wildlife	A primary difficulty with analyzing cumulative effects on waterfowl, not to mention other migratory birds, is the fact that their wintering grounds are also subject to change. No accurate information on loss of wintering grounds and how this affects populations is available.
Uncertainty – human	Habitat surveys are dated and similar suitable habitat as that near Wool Bay and Drybones Bay is unknown. Interference with cultural use of the land as in loss of access to resource is unknown. It is not known how many people use the area for hunting and how many birds are taken as a result.

Table 10. Fish

Social and cultural value	Food, income.
Habitat use	Unknown. Bays are likely used for all phases of life. Anticipated to be productive as 409 tonnes of fish are taken annually for that portion of Great Slave Lake.
Exposure	Fishing, exploratory on-ice drilling, sedimentation.
Uncertainty – fish	No studies – scientific or traditional – indicating the value of Wool Bay and Drybones Bay to the fish population in Great Slave Lake.
Uncertainty – human	Interference with cultural use as in loss of access to resource is unknown.

Table 11. Plants – Medicinal, food, tools, shelter

Social and cultural value	Food, shelter, tools, medicine
Habitat use	No information available on medicinal or food plants.
Exposure	Removal or disturbance.
Uncertainty – plants	No mapping has been done identifying important plant areas and their habitat needs.
Uncertainty – human	Interference with cultural use of plants such as in loss of access or loss of resource is unknown.

Table 12. Heritage Resources

Social and cultural value	Cultural link to the past (i.e., language, beliefs, traditions, history, knowledge of the land, archaeological resources). Indication of resource use and availability. Helps define culture by indicating pre-contact and post-contact land use, providing a history of life in the landscape.
Habitat use	Not applicable.
Exposure	Removal or disturbance.
Uncertainty – heritage resources	Only partial mapping has been completed for the regional study area. Current mapping efforts concentrated on the shoreline. No evaluation of findings has been completed.
Uncertainty – human	It is not known how many heritage resources have already been disturbed and what loss may have occurred with respect to social and cultural information.

Table 13. Spiritual areas – Landscape and place names

Social and cultural value	Defines culture, links to the past and to the land. The stories of the land that may come out in the place names, and may relate to the creation story.
Habitat use	Limited information available, provided by North Slave Metis Alliance.
Exposure	Disturbance, change of names, loss of access, loss of land
Uncertainty – spiritual areas	Very little spiritual and cultural information available or collected for the Regional Study Area.
Uncertainty – human	As the culture evolves, so could the relationship to the land. As the land changes, so do the cultural and spiritual values. It is not known how the cultural and spiritual values have changed or have been affected by changes to the land.

4.5 Identification of Potential Cumulative Effects

4.5.1 Past Activities and Developments

Little information was available for past activities and projects that have occurred in the Regional Study Area. Several recent drilling programs in the Drybones Bay Local Study Area were identified and drilling locations have been indicated on the Drybones Bay Biophysical Resources and Activities map (Appendix D). No information was identified or gathered on the type of activities associated with these programs or the amount of disturbance that may have resulted.

Local knowledge and the literature search have indicated that the Regional Study Area (and well beyond) has seen significant activity over many centuries. The early activities were related to resource harvesting (the fur trade) and possibly trade as new commodities were introduced to the north. These early activities likely did not affect the area from a cumulative perspective. As the fur trade changed and evolved, it became more of a traditional activity (i.e., trapping) for aboriginal people. As western society in general changed, towards a mechanized and industrial evolution, the search for non-renewable resources (e.g., oil and gas, and minerals) increased, sometime in the 1930's and 1940's mineral and hydrocarbon exploration activities were intensifying in the western arctic. These activities changed the face of the land in the Northwest Territories. Closer to the Regional Study Area, Yellowknife began to develop around two gold mines, soon becoming a major hub for further exploration in the north. This development affected the land and the people; and the mines themselves impacted the surrounding environment, including in the Regional Study Area.

4.5.2 Existing Activities and Developments

An aspect of regional cumulative effects assessment is the need to identify current and foreseeable land and water use activities and developments. The Regional Study Area between Dettah and Matonabbee Point hosts 60 active mineral claims, 1 active lease and 56 pending leases²⁹. A survey of other land and water based activities (i.e., activities for which a permit is required from the Mackenzie Valley Land and Water Board or a lease from DIAND) shows that a variety of land use permits and surface dispositions have already been given or have been applied for in this region. The survey findings are summarized in Table 14. Information on “values-at-risk³⁰” was not available.

There are also activities in the Regional Study Area for which permits may or may not be required but are known to occur in the region. This includes preparatory work being undertaken for the Snowfield drill program (i.e., cutlines), recreational camping, recreational fishing, hunting and trapping, berry picking, and so forth. Unfortunately, it was not possible to quantify the degree to which these activities occur.

Table 14. Summary of land and water activities in the Regional Study Area

Land and water activity (land use permits - active or expired)	Number or Noted	Land and water activity (surface disposition)	Number
Quarry	1	Cottages	2
Exploration (Land use applications)	9	Trapping cabins	1
Exploration (completed)	6	Commercial Fish Plants	2
Access trail	1	Navigational Aids	2
Other activities (not necessarily requiring licence, permit or authorization)		Values-at-risk (unregistered cabins)	N/A
Cutlines (exploration)	Yes		
Camping - recreational/traditional	Yes		
Fishing - recreational/ traditional	Yes		
Hunting - recreational/ traditional	Yes		
Trapping - recreational/traditional	Yes		
Berry picking - recreational/traditional	Yes		

N/A = not available.

²⁹ Source of information: Lands Directorate, Department of Indian Affairs and Northern Development

³⁰ Unpermitted cabins recorded by RWED forestry.

4.5.3 Proposed Activities and Developments

Currently under review are four (4) proposed diamond exploration projects. Each of these projects are anticipated to be completed generally within the 5-year timeframe of the land use permits. The proposed activities are summarized in Table 15. Each of the proponents have indicated in their Developer's Assessment Report (DAR) that they do not anticipate any significant adverse effects given the winter drilling program and the offshore nature of most of the proposed developments. One project proposed by Snowfield Development Corp. includes summer activities.

Activities that are anticipated to continue to occur are the ongoing seasonal activities, enjoyed by traditional users and the general public, associated with fishing, boating, hunting, berry picking and camping. There is no way to accurately quantify these activities.

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Table 15. Summary of Project Development Description from Developer’s Assessment Reports³¹

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
Timing	<ul style="list-style-type: none"> • Mud Lake Claim Group³²: <ul style="list-style-type: none"> - Grid establishment, ground geophysics, sampling: July-Sept 2003, duration not provided - Drilling: Oct 2003-April 2004, 60-100 day duration • Hurcomb Claim: <ul style="list-style-type: none"> - Grid establishment, ground geophysics, sampling: July-Sept 2003, duration not provided - Drilling: January-April 2004, 20-30 days • Red Claim Group: <ul style="list-style-type: none"> - Grid establishment, geophysics, sampling: < Oct-Dec 2003, 40-80 days • Fate Claim: <ul style="list-style-type: none"> - Drilling: Jan-April 2004, 10-15 days 	<ul style="list-style-type: none"> • Drybones Claims: February-April 2004, 8-10 week duration³⁴ 	<ul style="list-style-type: none"> • GSL Claims and GTEN Claim February-April 2004, 3-4 week duration³⁵ 	<ul style="list-style-type: none"> • WBL Mineral Claim: January-April 2004, <10 day duration

³¹ Except where otherwise noted, all information for this table was obtained from the Developer’s Assessment Reports. The table was supplemented with information from the Land Use Permits (LUP) in some areas.

³² This note applies to all of the Snowfield claims listed in this cell. The Snowfield LUP (item 5) identifies up to 4 stages for all claims except Fate and GTEN 16. The Snowfield DAR seems to describe only the first stage or the first and parts of the second stage (but all DAR descriptions are identified as from Stage I), and these descriptions do not necessarily match those in the Snowfield LUP

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<ul style="list-style-type: none"> • GTEN 16 Claim: <ul style="list-style-type: none"> - Grid establishment³³, ground geophysics, sampling: Oct 2003, 10-15 days - Drilling: Jan-April 2004, 10-15 days 			
Access Roads	<ul style="list-style-type: none"> • One (1) ice road on GSL from Yellowknife and Pebble Bay Camp • Access to Mud Lake Claim Group, Red Claim Group and Hurcomb Claim from the camp via existing access roads and trails established under an earlier land use permit • Additional limited overland access roads and trails to specific exploration and drill sites to be built under current permit. • Access to Fate and GTEN 	<ul style="list-style-type: none"> • Ice road on GSL from Yellowknife to Drybones Bay area to be constructed and used • Temporary winter access roads depicted on Map 2 (Unable to distinguish these on the map or from the text, so unable to determine how many or the extent of the roads). 	<ul style="list-style-type: none"> • Ice road on GSL from Yellowknife to Drybones Bay area to be constructed and used • Temporary winter access roads depicted on Map 2 (Unable to distinguish these on the map or from the text, so unable to determine how many or the extent of the roads). 	<ul style="list-style-type: none"> • Relying on ice road on GSL from Yellowknife to be built by other exploration companies • 300-400 m long ice road³⁶ spur from main ice road to work area to be constructed • Temporary winter access roads depicted on Map 2 (Unable to distinguish these on the map or from the text, so unable to determine how many or the extent of the roads).

³³ Snowfield LUP (item 5) does not mention grid establishment as it does for Red, Mud Lake and Hurcomb Claims

³⁴ Including mobilization and demobilization of drilling equipment and consumables to the site and for final clean-up and restoration

³⁵ Including mobilization and demobilization of drilling equipment and consumables to the site and for final clean-up and restoration

³⁶ North American LUP (item 8) indicates the spur will be 1 km long

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<p>Claim areas from YK or camp via fixed-wing aircraft or helicopter</p> <ul style="list-style-type: none"> • Operations requiring vehicle access will be conducted during winter-spring period 			
Camps / Fuel Storage Areas	<ul style="list-style-type: none"> • One (1) semi-permanent camp and equipment storage area “Pebble Beach Camp” • Accommodates up to 20 persons, 5-6 sleep tents kitchen/dining tent, office/ first aid tent, wash/shower tent – tents wooden framed with plywood floor • Additional structures (tents or modular structures) will be established as required for latrines, supplies storage, core storage and helicopter supplies. • Designated burn area, helipad, camp fuel cache, diesel generator, electric water pump 	<ul style="list-style-type: none"> • One (1) camp to be located at an established and previously permitted camp site • Accommodates up to 8 persons, 3-4 sleep tents kitchen/dining tent, office/ first aid tent, wash/shower tent – tents wooden framed with plywood floor • Additional structures (tents or modular structures) will be established as required for latrines, supplies storage, core storage and helicopter supplies. • Designated burn area, helipad, camp fuel cache, diesel generator, electric 	<ul style="list-style-type: none"> • No camp required³⁷ 	<ul style="list-style-type: none"> • No camp required

³⁷ Consolidated Goldwin LUP (item 5b) indicates “mobile camp if necessary – temporary for 1-2 weeks, most likely to be helicopter supported from YK”, plus there is further expansion of camp requirements in a Feb 4, 2003 letter (paragraph 5) attached to the LUP application form.

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<ul style="list-style-type: none"> • Potable water pumped from GSL to be stored in dry holding tank; greywater dispersed to an outfall at a sump of suitable capacity. • Discrete fuel storage area separate from camp: <ul style="list-style-type: none"> - 10 - 205 L drums of diesel - 4 - 205 L drums of jet fuel - 2 - 205 L of gasoline - 4 - 100 lb containers of propane (2 additional containers will be stored in the kitchen area) - oils for generator and water pump will be stored in the generator shed 	<p>water pump</p> <ul style="list-style-type: none"> • Potable water pumped from GSL stored in dry holding tank; greywater dispersed to an outfall at a sump of suitable capacity • Discrete fuel storage area separate from camp: <ul style="list-style-type: none"> - 10 - 205 L drums of diesel - 4 - 205 L drums of jet fuel - 2 - 205 L of gasoline - 4 - 100 lb containers of propane (2 additional containers stored in the kitchen area) - oils for generator and water pump stored in the generator shed 		
Drill Sites	<ul style="list-style-type: none"> • Drill Site Areas: 5 areas in total (unable to determine if all these sites are on land) • Area 1 – drilling from 15 	<ul style="list-style-type: none"> • Drill Site Area: 3 areas in total (2 on ice, 1 on land and ice (unable to determine if third site is on land and ice) 	<ul style="list-style-type: none"> • Drill Site Area: 3 areas in total (2 on ice and 1 on land) with disturbance footprint of 10⁴¹ m² for each individual 	<ul style="list-style-type: none"> • Drill Site Area: 1 area on ice, occupying about 200 m x 200 m)⁴³, with disturbance footprint of 10 m x 10 m for

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<p>sites up to 20 drill holes, 100-200 m depth</p> <ul style="list-style-type: none"> • Area 2 – drilling from 7 sites up to 10 drill holes, 100-200 m depth • Area 3 – drilling from 20-30 sites up to 1-2 drill holes per site, 100-200 m depth • Area 4 – drilling from 1-2 sites to total of 3 drill holes, 100-200 m depth • Area 5 – drilling from 3 sites to total of 5 drill holes, 100-200 m depth 	<p>with disturbance footprint of 10³⁸ m² for each individual drill site</p> <ul style="list-style-type: none"> • Boreholes³⁹: up to a total of 10 holes⁴⁰, 2-5 inches in diameter <ul style="list-style-type: none"> - Site 1: 6 holes, 200-300 m depth - Site 2: 2-3 holes, 200-300 m depth - Site 3: 1 hole, 300-400 m depth 	<p>drill site</p> <ul style="list-style-type: none"> • Boreholes: 5 holes total, 2-5 inches in diameter <ul style="list-style-type: none"> - Site 1: 2 holes, 200-300⁴² m depth - Site 2: 2 holes, 200-300 m depth - Site 3: 1 hole, 200-300 m depth 	<p>each individual drill site</p> <ul style="list-style-type: none"> • Boreholes: <ul style="list-style-type: none"> - Number: 2 to 3 boreholes - Hole diameter: 2 inches - Hole depth: approx. 150 m
Operations	<ul style="list-style-type: none"> • General Winter Activities: ground and helicopter supported drill programs, ground geophysical and ground penetrating radar surveys, trenching for samples 	<ul style="list-style-type: none"> • General Activities: <ul style="list-style-type: none"> - Airborne and ground geophysical surveys, line cutting when necessary, rock/till sampling, drilling using reversible circulation drill (info from LUP) 	<ul style="list-style-type: none"> • General Activities: Drilling, geophysical surveys (info from LUP) • Personnel: Up to 6 persons⁵⁰ on site • Equipment: <ul style="list-style-type: none"> - Portable drilling unit 	<ul style="list-style-type: none"> • General Activities: Drilling angled NQ core holes (LUP) • Personnel: Up to 6 persons⁵¹ on site • Equipment: 1-BBS-25A drill or equivalent, 2-4x4 pick-up trucks, 1-skidder

³⁸ Should this possibly be 100 m² (10 m x 10 m) as 10 m² seems to be a very small area

³⁹ The summary (p. 2) indicates hole depths range up to 250 m, but the numbers in the main text range up to 300 and 400 m. Actually depth unknown.

⁴⁰ New Shoshoni DAR p. 5 indicates that up to 10 drill holes on each of the 3 areas; but page 7 indicates that the total for all 3 holes combined will be 10 (as outlined in the table 6+3+1)

⁴¹ Should possibly be 100 m² (10 m x 10 m) – 10 m² is a very small area.

⁴² Summary (p. 2) indicates depth range of 200-250 for all holes. Page 6 - site 1 to 3 are indicated at having depth of 200-300 m. Actually depth unknown.

⁴³ North American LUP (item 5) indicates “the area to be used is 0.2 hectares” which is much less than 200 m x 200 m (equivalent to 4 ha)

⁴⁴ Snowfield LUP (item 6) also mentions potential use of a Poly-Drill tank if pumping drill cuttings from lake ice based drilling sites is impractical

⁴⁵ Container numbers for camps shown in brackets do not match the container numbers under the Camp category above.

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<ul style="list-style-type: none"> • General Summer Activities: geochemical sampling surveys, airborne/ground geophysical and ground penetrating radar surveys, prospecting, helicopter supported drill programs (where ground surface conditions permit), will establish and use foot accessible grid lines • Personnel: vary from 3 to 20 persons: • Equipment⁴⁴: 1-3 wire-line core drills, skidder, Nodwell, TD-20 Caterpillar, excavator, 1-3 snow machines, 1-3 all terrain vehicles, electrical generators, water pumps, 1-2 	<ul style="list-style-type: none"> - Line cutting width to allow only for single person passage (info from LUP) • Personnel: Up to 6⁴⁶ persons⁴⁷ on site, involved in drilling program • Equipment: <ul style="list-style-type: none"> - Drill is set in a self-contained completely enclosed module - Drill, Nodwell, skid mounted dump shack, 3-skidoos, 2-4x4 pick-up trucks, vacuum truck (if required), reverse circulation drill (info from LUP) • Travel: <ul style="list-style-type: none"> - Temporary ice winter 	<p>(Longyear 38 or equivalent), various pumps, tractor (last 2 items from LUP)</p> <ul style="list-style-type: none"> • Travel: <ul style="list-style-type: none"> - Use temporary ice winter road for daily commuting and clean up of site • Fuels: <ul style="list-style-type: none"> - Less than 250 L of petroleum products on site at any given time - 2-4 - 45 gallon drums diesel (info from LUP) - 1 - 45 gallon drum gasoline (info from LUP) - 1 - 45 gallon drum aviation fuel (info from LUP) - 1-2 100 lb containers of 	<ul style="list-style-type: none"> • Travel: <ul style="list-style-type: none"> - 3-4 trips per day between work area and YK (travel by 4x4 pick-up trucks) - Diesel brought in daily by 100 gallon tidy-tanks, total amount will be 500 gallons - Propane brought in daily via 100 lb tanks, total amount will be 3000 lb. - No helicopter required • Fuels: <ul style="list-style-type: none"> - 500 gallons diesel (1 – 100 gallon tidy tank brought in and removed daily) (info from LUP) - 3,000 lb propane tanks (3 – 100 lb containers

⁴⁶ LUP indicates up to 15 persons

⁴⁷ New Shoshoni DAR also indicates that during the drilling program 1-2 geophysicists or geophysical technicians, and 1-2 geologists or geotechnicians may also be in the general area but their actions are not covered by the scope of this application

⁴⁸ Camp description above indicates possibility of helicopter (mentions “helipad” and “Additional structures will be established as required for...helicopter supplies/equipment. Also the New Shoshoni LUP indicates airborne and ground geophysical surveys)

⁴⁹ New Shoshoni LUP (item 11) indicates that up to 30 drums of diesel will be required for camp and drill use, but this is not stated in the New Shoshoni DAR, only that up to 10 drums of diesel will be stored at the storage area.

⁵⁰ Consolidated Goldwin DAR (p. 7) also during the drilling program 1-2 geophysicists or geophysical technicians, and 1-2 geologists or geotechnicians may also be in the general area but their actions are not covered by the scope of this application

⁵¹ North American General Resources Corporation DAR indicates there will be two 2-person drilling crews/shifts, so operations may include only 4 persons

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<p>trucks (winter use), camp tents, frames, and floors, Hughes 500 D helicopter, Cessna 185/DHC2 Beaver</p> <ul style="list-style-type: none"> • Travel: <ul style="list-style-type: none"> - In summer 2-4 flights/week (fixed wing or helicopter) from YK or camp - Drill moves 1-3 hr helicopter time • Fuels⁴⁵: <ul style="list-style-type: none"> - 10 - 205 L drums of diesel (2-camp, 8-drill site) - 2 - 205 L drums gasoline (1-camp, 1-drill) - 10 - 205 L jet turbine fuel, 2 - 205 L aviation fuel (6-camp, 4-drill site) - 10 - 100 lb containers of propane (4-camp, 4-drill site) - 1 - 100 lb acetylene and 1 - 100 lb oxygen (1-drill-site) 	<p>road for daily commuting and clean up of site</p> <ul style="list-style-type: none"> - No helicopter use anticipated⁴⁸ • Fuels⁴⁹: <ul style="list-style-type: none"> - Less than 2000 L of petroleum products on-site at any given time - Up to 30 - 205 L drums of diesel (camp and drill site) (info from LUP) - 2 - 205 L drums of gasoline (camp) (info from LUP) - 4 - 205 L drums of aviation fuel (camp) (info from LUP) - 6 - 100 lb containers of propane (camp and drill site) (info from LUP) 	<p>propane (info from LUP)</p>	<p>brought in and removed daily) (info from LUP)</p>
Waste	<ul style="list-style-type: none"> • Non-combustible waste to be 	<ul style="list-style-type: none"> • With the exception of drill 	<ul style="list-style-type: none"> • For on-ice drilling, all wastes 	<ul style="list-style-type: none"> • Drill cuttings to be collected

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
Management	<p>disposed in YK to landfill or recycled</p> <ul style="list-style-type: none"> • Combustible waste to be burned in the field and either buried in approved sites or transported to YK for approved disposal • Sanitary sewage contained in outhouses, limed and capped upon discontinuance of use/camp closure • Greywater piped to sump, covered in winter. Biodegradable, low phosphate soaps used • Bush and tree cuttings reduced to manageable size and neatly piled. Cleared vegetation may be spread over exposed soil, where appropriate • Earthmoving for construction of small pits and sumps for collection and 	<p>cuttings for the on-land holes, all drilling and operational wastes to be removed and to YK for approved disposal. Drill cuttings from on-land drilling will be placed into an approved land depression well removed from waterbodies⁵²</p> <ul style="list-style-type: none"> • Drill cuttings total of 2.5 to 5.0 m³ (0.25-0.5 m³/hole) • Any required bush and tree cuttings reduced to manageable size and neatly piled. Cleared vegetation may be spread over exposed soil, where appropriate 	<p>including drill cuttings will be removed off-site to YK for approved disposal. Drilling cuttings from on-land drilling disposed of in natural depression.⁵³</p> <ul style="list-style-type: none"> • Drill cuttings total of 1.0-2.0 m³ (0.25-0.5 m³ /hole) • No sanitary or grey water to dispose of • Any required bush and tree cuttings reduced to manageable size and neatly piled. Cleared vegetation may be spread over exposed soil, where appropriate⁵⁴ 	<p>by Poly-drill (Wipple system) and transported to YK daily (via pick-up truck) for deposit in landfill</p> <ul style="list-style-type: none"> • All other wastes will also be removed daily • No disturbance to bush or trees, therefore no disposal planned • No sanitary or grey water to dispose of • Drill cuttings 0.2-0.5 m³/day

⁵² p. 2 and 23 (New Shoshoni DAR) indicates that all wastes will be removed from the site, including drill cuttings. New Shoshoni LUP indicates garbage burned and/or removed to YK. The camp description above also indicates that some burning will occur re “designated burn area”

⁵³ p. 2 and 23 (Consolidated DAR) indicates that all wastes will be removed from the site, including drill cuttings. Consolidated Goldwin LUP indicates garbage to be “taken away”.

⁵⁴ Consolidated Goldwin LUP under proposed disposal methods for c) Brush and Trees indicates “Not disturbed”

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	<p>disposal of benign waste and trenching for sampling</p> <ul style="list-style-type: none"> • Drill cuttings and fluids collected in tanks or topographic low areas. • Total drill cuttings 0.25-0.50 m³ for each drill site 			
Water Use	<ul style="list-style-type: none"> • Source: For drilling, water will be obtained from small lakes and ponds in area of drill sites • Amount: 25,000 L of water to be used per hole. Water will be re-circulated. • Management: Used water with drill cuttings to be disposed of in approved land site pumps • Ice Road: Not anticipated that much, if any, water from GSL will be used to make ice road 	<ul style="list-style-type: none"> • Source: obtain water from GSL for most of exploration drilling program • Amount: 25,000 L of water to be used per hole. Water will be re-circulated. • Management: Used water to be disposed of on land in safe benign manner 	<ul style="list-style-type: none"> • Source: Obtain water from GSL and small unnamed pond • Amount: 25,000 L of water to be used per hole. Water will be re-circulated. • Management: Used water to be returned to YK and disposed of in approved manner. 	<ul style="list-style-type: none"> • Source: Obtain water from GSL • Amount: Net amount of water use approximately 3,000 gallons (13,638 L) • Management: Using a 500 gallon holding tank, water will be re-circulated. After 1.5 days of recirculation, water would be pumped to a localized natural depression on land (at least 30 m from shoreline)
Future Development	<ul style="list-style-type: none"> • Future development depends on outcome of this drilling program. If success encountered, a number of additional years of confirmatory exploration 	<ul style="list-style-type: none"> • Future development depends on outcome of this drilling program. If success encountered, a number of additional years of confirmatory exploration 	<ul style="list-style-type: none"> • Future development depends on outcome of this drilling program. If success encountered, a number of additional years of confirmatory exploration 	<ul style="list-style-type: none"> • Future development depends on outcome of this drilling program. If success encountered, a number of additional years of confirmatory exploration

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

	Snowfield Development Corp.	New Shoshoni Ventures Inc.	Consolidated Goldwin Ventures Inc.	North American General Resources Corporation
	drilling and sampling would be required.	drilling and sampling would be required.	drilling and sampling would be required.	drilling and sampling would be required.
Alternatives	<ul style="list-style-type: none"> • Camps: floating camp in summer and transporting by vehicle and aircraft during winter and breakup • Waste Management: Leave or not burn wastes on site. 	<ul style="list-style-type: none"> • Drill locations: off-set specific drill locations by few metres to avoid sensitive sites • Camps: options for camps would be a modular unit driven down on the ice and a similar unit barged or boated to the area during summer • Waste Management: leave or bury wastes on-site 	<ul style="list-style-type: none"> • Drill locations: off-set specific drill locations by few metres to avoid sensitive sites • Waste Management: leave or bury waste 	<ul style="list-style-type: none"> • Drill season: Drill during summer • Waste Management: leave drill cuttings on ice, deposit cuttings in depression on nearby island, collect and remove cuttings to YK landfill (as proposed in DAR). Same options available for waste core and garbage handling.
Restoration Activities	<ul style="list-style-type: none"> • Primary site restoration activities to occur upon completion of work at each site with any final restoration being undertaken during summer months • Removal of all wastes, land use areas restored to prior condition, to extent possible (info from LUP) • Where casings must be left in place it will be cut to ground and plugged and covered with surface soil material. (info from LUP) 	<ul style="list-style-type: none"> • Drill sites cleaned as program progresses, garbage burned or removal to YK (info from LUP) 	<ul style="list-style-type: none"> • No surface disturbance expected, therefore no restoration activities planned. All materials removed after completion of program (info from LUP) 	<ul style="list-style-type: none"> • No surface disturbance expected, therefore no restoration plans. Removal of all wastes

4.5.4 Foreseeable Activities and Developments

The scope of this project included consideration of foreseeable activities and developments, which are those that have a strong likelihood of occurring. In this situation, it was assumed that some kind of exploration activity would take place on each of the 56 pending onshore and offshore leases, to the same or similar extent as the current development applications before the Review Board. In relation to the proposed developments, foreseeable activities and developments could include bulk sampling (by trenching), indicated by Snowfield, and bulk sampling by other developers if diamondiferous kimberlite is encountered. Geophysical sampling and prospecting is assumed to be on-going as well.

Activities that are anticipated to continue to occur are the ongoing seasonal activities associated with community and general public fishing, boating, hunting, berry picking and camping. There is no way to accurately quantify these activities.

As Land Claim Agreements or Treaties are negotiated with the First Nations of the Great Slave Lake region, additional changes to the area will occur. One significant change will be the possible establishment of a National Park (or National Park Reserve) encompassing most of the land and waters of the east arm of Great Slave Lake⁵⁵. Boundaries for this park have already been identified and there appears to be support for its establishment with First Nations in the Region. If this park is established⁵⁶, it will change the way users of the east arm (i.e., hunters, fishers, boaters) can use the area, and harvest from the area. It is anticipated that those areas not inside the park will have increased popularity for access and harvesting. These areas will include the Regional Study Area. There is no way to quantify this anticipated change in land use, or the intensity of the activities in the Regional Study Area at this time.

⁵⁵ For more than 20 years, an area known as the East Arm of Great Slave Lake has been considered for a national park. In 1970, 7150 square kilometres of land in this area were withdrawn under the Territorial Lands Act for national park purposes. This is a spectacular landscape - an immense archipelago of islands in Great Slave Lake, long fault-block escarpments, gorges and waterfalls, and much more. Progress on this national park proposal has been stalled for some time. The Aboriginal people who will be most affected by the proposal are concerned about the effects of a national park on their traditional use of the land and on their lifestyle. There is no local consensus on whether a park would be appropriate. The federal government has assured the people of Lutselk'e that a park will not be established without their agreement. Parks Canada expects to resume discussion on this park proposal with the people of Lutselk'e at the appropriate time in their Treaty 8 land entitlement negotiations. The support of the Government of the Northwest Territories is also required. Source: http://collection.nlc-bnc.ca/100/200/301/ic/can_digital_collections/parks_atlas/chap17/REGION17.html

⁵⁶ On December 17, 1997 His Excellency the Governor General in Council, on the recommendation of the Minister of Indian Affairs and Northern Development, pursuant to paragraph 23(a) of the *Territorial Lands Act*, hereby repeals the Withdrawal from Disposal Order, made by Order in Council P.C. 1970-526 of March 24, 1970^a, and makes the annexed Order respecting the Withdrawal from Disposal of Certain lands in the Northwest Territories. The purpose of this Order is to withdraw certain lands from disposal to establish a proposed national park on the East Arm of Great Slave Lake National Park, Great Slave Lake, in the Northwest Territories. Source: <http://laws.justice.gc.ca/en/T-7/SI-98-3/179503.html>

4.6 Evaluation

The completion of any analysis related to cumulative effects is challenging. The completion of this analysis for a study area that has minimal information on the biophysical and human environments contributes to this challenge.

The purpose of this evaluation is not to complete an environmental assessment or a cumulative effects assessment, but, considering the reasons for referral, to evaluate potential cumulative effects on biological resources of social and cultural value, and on heritage and spiritual resources. The Review Board, under the authority of the *Mackenzie Valley Resource Management Act*, has the responsibility to complete an environmental assessment and cumulative effects assessment of the developments referred to it for assessment. The Review Board may consider the information contained in this report in its decision making process.

4.6.1 What We Know

The four (4) developers in the Regional Study Area have proposed winter drilling programs that will involve either onshore or offshore activities (Figure 6), and in some cases both. Table 15 in this report also describes the proposed developments for each developer. One developer, Snowfield, is also proposing activities throughout the year.

4.6.1.1 Snowfield

Snowfield has the most extensive onshore program. Its proposal involves a series of drill programs⁵⁷ according to five (5) claim areas and potentially up to 17 grids⁵⁸ of 1 km² each checking previously identified geophysical anomalies or target areas. An estimated 100 (maximum) boreholes will be drilled. The cutlines for some of the 1 km square grids was completed during the summer of 2003. Cutline spacing or width information was not indicated, and repeated requests to provide the information were not successful. They have also proposed a camp and helicopter support along with the need to put in place additional trails and roads over and above the trails and roads previously established.

Snowfield has already conducted a summer field program preparing some of the sites for the winter drilling program by establishing several 1 km square grids with cutlines, performing ground geophysics, and till/soil sampling. It is proposing further summer programs, as outlined in its development schedule provided in a letter to the Review Board, dated September 1, 2003⁵⁹.

⁵⁷ Note: On September 1, 2003 Snowfield indicated to the MVEIRB that it would proceed with its bulk sample at a future date, after an amendment to the Land Use Permit has been secured. The Review Board is considering the bulk sample as a potential “future” activity.

⁵⁸ It is unclear from the Snowfield application and DAR whether 1 km square grids would be cut for each identified drill location.

⁵⁹ Letter dated September 1, 2003 to Ms. Sherry Sian/Mr. Alan Ehrlich, MVEIRB from Robert T. Patterson, Snowfield Development Corp.

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

The development is located in an area south and east of Drybones Bay and located on Canadian shield typified by rock outcrops, bogs, water courses, lakes, and vegetated landscape.

Figure 6. Onshore and Offshore Activities in Regional Study Area

(This figure will be provided at a later date)

(This figure will show the Regional Study Area with the mineral leases and proposed drill locations)

Footprint of impact:

Snowfield has indicated that each drill site will have a temporary footprint of disturbance of approximately 10 m²⁶⁰. It is assumed these drill site footprints would be cleared areas to accommodate the drill rig and allow crews to work safely. It is also assumed these drill sites would all be located within the established 1 km square grids. Access routes into each grid and drill location would be by a trail or cutline of sufficient width to allow transport of a portable drill (no trail/cutline width information was provided; however, documentation from an existing drill program undertaken by Dave Smith indicated access trails of 3m widths⁶¹). Wherever possible, it is assumed these access routes would follow frozen water courses for winter drilling programs, and overland routes for summer programs.

Additional footprint relates to the established camp and equipment storage area located just south of Drybones Bay (no indication of size or extent of disturbance) and temporary disturbance in the form of ice road access from Yellowknife to the drill sites for winter drilling programs.

4.6.1.2 New Shoshoni Ventures Inc.

NSV is proposing a three site exploration drill program for the winter of 2003/2004, anticipated to be carried out over an eight to ten week period between February and April, 2004. The drill program will involve drilling up to ten (10) holes at the three proposed drill sites.

The three drill sites are located within the Drybones Bay Local Study Area, approximately 500 metres west of an identified and registered archaeological grave site. Drilling will be through the ice in water greater than 15 metres depth, and land based locations. Drill-hole depths will range between 200 and 400 metres.

The development is located on the south shore of Drybones Bay and in adjacent offshore areas. Land based drill locations are located on Canadian shield typified by rock outcrops, bogs, water courses, lakes, and vegetated landscape.

Footprint of impact:

NSV has indicated that each on-land drill site will have a temporary footprint of disturbance of approximately 10 m². It is assumed these drill site footprints would be cleared areas to accommodate the drill rig and allow crews to work safely. Access routes into each grid and drill location would be by a trail or cutline of sufficient width to allow transport of a portable drill (no cutline widths were provided; however, documentation from an existing drill program undertaken by Dave Smith indicated access trails

⁶⁰ Letter dated September 1, 2003 to Ms. Sherry Sian/Mr. Alan Ehrlich, MVEIRB from Robert T. Patterson, Snowfield Development Corp.

⁶¹ Letter dated June 10, 2003 from Dave Smith, to Clint Ambrose, Resource Management Officer II, South Mackenzie District, DIAND, regarding Land Use Permit #N1999C0104.

of 3m widths⁶²). Wherever possible, it is assumed these access routes would follow frozen water courses for winter drilling programs.

The on-ice winter drilling locations would have a very limited and temporary disturbance of the ice surface. Lake bottom disturbance for on-ice drilling was not indicated in the DAR. However, a study supported by the West Kitikmeot / Slave Study Society related to aquatic impacts of on-ice drilling, suggested that the effects of hard rock drilling (release of between 0.2 and 0.6 cubic metres of rock fines) dissipated within 15 m of the drill location; and, the effects of on-ice drilling into kimberlite (release of between 0.6 and 1.0 cubic metres of kimberlite effluent) showed short-term decrease in benthic invertebrates in the zone of impact (zone of impact not indicated) but generally a long-term increase in benthos (Wilson, 2000). NSV has indicated it is using a closed circulation system for on-ice drilling in offshore areas, which should result in the recovery of all drilling fluids and cuttings for proper disposal. No impacts are anticipated from this activity.

Additional footprint relates to the established camp located on the south shore of Drybones Bay (no indication of size or extent of disturbance). And, temporary disturbance in the form of ice road access from Yellowknife to the drill sites for winter drilling programs.

4.6.1.3 Consolidated Goldwin Ventures Inc.

CGV is proposing a three site preliminary exploration drill program for the winter of 2003/2004, anticipated to be carried out over a three week period between February and April, 2004. The drill program will involve drilling up to two holes at each of the three proposed drill sites.

Two of the sites are located within the Drybones Bay Local Study Area, between 500 and 1500 metres from shore. Drilling will be through the ice, in water greater than 15 metres in depth. Drill-hole depths will range between 200 and 250 metres.

The third drill site is located on land, approximately 500 metres north of Hearne Channel.

The development is located to the west of Drybones Bay in the offshore, and on land north of Hearne Channel located on Canadian shield typified by rock outcrops, bogs, water courses, lakes, and vegetated landscape.

Footprint of impact:

CGV has indicated that each on land drill sites will have a temporary footprint of disturbance of approximately 10 m². It is assumed these drill site footprints would be cleared areas to accommodate the drill rig and allow crews to work safely. Access routes into each grid and drill location would be by a

⁶² *ibid*

trail or outline of sufficient width to allow transport of a portable drill (no outline widths were provided; however, documentation from an existing drill program undertaken by Dave Smith indicated access trails of 3m widths⁶³). Wherever possible, it is assumed these access routes would follow frozen water courses for winter drilling programs.

The on-ice winter drilling locations would have a very limited and temporary disturbance of the ice surface. Lake bottom disturbance for on-ice drilling was not indicated in the DAR. However, a study supported by the West Kitikmeot / Slave Study Society related to aquatic impacts of on-ice drilling, suggested that the effects of hard rock drilling (release of between 0.2 and 0.6 cubic metres of rock fines) dissipated within 15 m of the drill location; and, the effects of on-ice drilling into kimberlite (release of between 0.6 and 1.0 cubic metres of kimberlite effluent) showed short-term decrease in benthic invertebrates in the zone of impact (zone of impact not indicated) but generally a long-term increase in benthos (Wilson, 2000). CGV has indicated it is using a closed circulation system for on-ice drilling in offshore areas, which should result in the recovery of all drilling fluids and cuttings for proper disposal. No impacts are anticipated from this activity.

No camp is anticipated; but, if required they may use the already licenced camp used by Snowfield.

4.6.1.4 North American General Resources Corporation

NAGRC is proposing a 2 to 3 hole, one site exploration drill program for the winter of 2003/2004, anticipated to be carried out over a 10 day period between late January and April, 2004. The drill site is located within the Wool Bay Local Study Area, near an unnamed island approximately 250 metres south and east of the shoreline of Great Slave Lake. Drilling will be through the ice in water, offshore of the unnamed island. Drill-hole depths will be approximately 150 metres in depth.

The development is located to the south and east of Wool Bay. It is an offshore drilling program, located near a small island on Canadian Shield typified by rock outcrops, bogs, water courses, lakes, and vegetated landscape.

Footprint of impact:

NAGRC has indicated its entire drill program would be limited to an on-ice area approximately 200m x 200m, while each individual on-ice drill site would utilize a space under 10m x 10m in size.

The on-ice winter drilling locations would have a very limited and temporary disturbance of the ice surface. Lake bottom disturbance for on-ice drilling was not indicated in the DAR. However, a study supported by the West Kitikmeot / Slave Study Society related to aquatic impacts of on-ice drilling,

⁶³ Letter dated June 10, 2003 from Dave Smith, to Clint Ambrose, Resource Management Officer II, South Mackenzie District, DIAND, regarding Land Use Permit #N1999C0104.

suggested that the effects of hard rock drilling (release of between 0.2 and 0.6 cubic metres of rock fines) dissipated within 15 m of the drill location; and, the effects of on-ice drilling into kimberlite (release of between 0.6 and 1.0 cubic metres of kimberlite effluent) showed short-term decrease in benthic invertebrates in the zone of impact (zone of impact not indicated) but generally a long-term increase in benthos (Wilson, 2000). NAGRC has indicated it is using a closed circulation system for on-ice drilling in offshore areas, which should result in the recovery of all drilling fluids and cuttings for proper disposal. No impacts are anticipated from this activity.

No camp is associated with this development. Crews will commute to the development location from Yellowknife each day.

4.6.2 Scoping Cumulative Effects

The DARs of the developers were reviewed and an independent evaluation of possible residual effects was undertaken (see Table 15 for summary of developments). This was accomplished by identifying potential development and activity impacts information, which is summarized in a potential effects matrix (Table 16). To assist the Review Board with its cumulative effects assessment, the possible areas of overlap between the residual effects of existing activities and developments and the potential residual effects of the proposed developments were identified. These are listed against the identified VECs (from Tables 6 – 13) by location of the development (Table 17).

Table 17. Potential cumulative effects on VECs from proposed development activities

Valued Environmental Component	Onshore Activities Potential Cumulative Effects	Offshore Activities Potential Cumulative Effects
Caribou	<ul style="list-style-type: none"> • Terrestrial – disruption/loss of critical habitat • Terrestrial – habitat fragmentation/loss • Disruption/loss of migration routes • Noise 	<ul style="list-style-type: none"> • Noise • Ice road traffic
Moose	<ul style="list-style-type: none"> • Terrestrial – habitat fragmentation/loss • Terrestrial – disruption/loss of critical habitat • Disruption/loss of vegetation cover • Noise 	<ul style="list-style-type: none"> • Noise • Shoreline alterations
Fur bearers	<ul style="list-style-type: none"> • Habitat fragmentation/loss • Noise 	<ul style="list-style-type: none"> • Noise • Shoreline and bottom alteration
Water fowl	<ul style="list-style-type: none"> • Habitat fragmentation/loss • Noise (summer program only) 	<ul style="list-style-type: none"> • Shoreline and bottom alteration
Fish	<ul style="list-style-type: none"> • Surface water quality 	<ul style="list-style-type: none"> • Shoreline and bottom alteration
Plants	<ul style="list-style-type: none"> • Disturbance/loss vegetation/ forest cover • Surface water quality • Interaction with surface drainage • Soil compaction and settling • Greenhouse gases 	<ul style="list-style-type: none"> • Greenhouse gases • Shoreline and bottom alteration
Heritage resources	<ul style="list-style-type: none"> • Direct removal of archaeological sites • Direct removal of cultural/spiritual sites 	
Spiritual areas	<ul style="list-style-type: none"> • Direct removal of archaeological sites • Direct removal of cultural/spiritual sites • Loss of cultural land use • Loss of access to land • Changes to the land 	

4.6.3 Cumulative Effects Decision-Making Tool

Developing a cumulative effects decision-making tool to help the Review Board make better decisions about the contribution of existing and proposed development's to potential cumulative effects, and to make effective recommendations for development in the Regional Study Area, is a complicated process and one that will not be completed, for broad general application in future EAs, in this report. Standard and accepted practices for completing EAs and cumulative effects assessments being used today, such as those procedures followed by the Review Board, are quite good at determining significant adverse impacts to social and biophysical resources. What is not available, or available as a widely accepted practice, are cumulative effects methodologies for completing these types of assessments on cultural and heritage resources. Given the short timeframe for completing this work, the lack of site specific information regarding the biophysical, social, cultural and heritage resources of the Regional Study Area, and considering the reasons for referral of the four developments before the Review Board, a proposal methodology for considering significant adverse impacts identifies VEC's of cultural and spiritual value.

In the previous sections of this report, information was provided on identifying those components of the environment of particular social and cultural value and to identifying activities that may affect or interfere with continuing traditional activities; thus maintaining an aspect of culture^{64, 65}. Information was also provided on the importance of the land and heritage sites to the Dene.

4.6.3.1 Methodology for Cumulative Effects Tool

For the purposes of this report the following methodology is provided to assist the Review Board.

1. Conduct EA and identify impacts on the environment and residual effects for each development proposal
2. Collectively compare the identified residual effects from the following sources:
 - each of the development proposals;
 - those identified in Table 17 and
 - those identified from any past, current and proposed developments or activities that might impact the Region Study Area (section 4.7 provides guidance for these considerations).
3. Determine whether or not there is a potential for cumulative impacts to occur.
4. If potential cumulative effects have been identified, make a significance determination. Use Table 18 to assist in this determination for identified VEC's.

⁶⁴ There is no single accepted concept of culture. Some of the common concepts are: 1) a total body of tradition borne by a society and transmitted from generation to generation (Murphy 1986); and 2) the total way of life of a people, the social legacy the individual acquires from his group, and a way of thinking, feeling, and believing (<http://socserv.socsci.mcmaster.ca/~anthro/faculty/mackey/wk2lect.htm>).

⁶⁵ It is not possible in the short time of this project to completely consider the cumulative loss of culture. Therefore, only culture related to the biological environment was focussed on.

4.6.3.2 Cumulative Effects Assessment Considerations

This section concentrates on establishing some indicators or benchmarks for evaluating the potential significance of impacts on the identified VECs.

The MVRMA does not define culture, but it does define heritage resources:

s2 “heritage resources” means archaeological or historic sites, burial sites, artefacts and other objects of historical, cultural or religious significance, and historical or cultural records.

The Oxford dictionary defines culture⁶⁶ as, “**1.** *the arts, customs, and institutions of a nation, people, or group.*” Other useful definitions for this discussion include:

institution⁶⁷, “**3.** *an established law or custom.*”;
custom⁶⁸, “**1.** *a traditional way of behaving or doing something that is specific to a society, place, or time...*”;
traditional⁶⁹, “**1.** *having to do with or following tradition...*”; and,
tradition⁷⁰, “**1.** *the passing on of customs or beliefs from generation to generation. 2. a long-established custom or belief passed on in this way...*”.

It is evident that culture is inextricably linked to humanity through such means as heritage resources, and a society, group or community of people that are able to express themselves through traditional ways of being or traditional activities, and having the capacity to pass these on from one generation to another. In the context of this report, the society or group of people would be the North Slave Metis Alliance, and the Yellowknives Dene who have expressed concerns that the development proposals in the Drybones Bay and Wool Bay areas would be a cause of cumulative impacts in areas of “...*significant spiritual and cultural importance...*”⁷¹. The Yellowknives have identified Wool Bay and Drybones Bay as being culturally vital and spiritually significant, where traditional activities, such as harvesting, camping and trapping take place. The North Slave Metis Alliance also identified these areas as being places where traditional activities occur.

Heritage resources should properly be dealt with in any EA process as biophysical resources. That is, heritage resources, by definition, are inanimate objects and when found in the landscape, can be avoided as any other inanimate structure can be. Therefore, the consideration of heritage resources in an EA

⁶⁶ Oxford Paperback Dictionary Thesaurus and Wordpower Guide. Oxford University Press, 2001. Page 208.

⁶⁷ Oxford Paperback Dictionary Thesaurus and Wordpower Guide. Oxford University Press, 2001. Page 469.

⁶⁸ Oxford Paperback Dictionary Thesaurus and Wordpower Guide. Oxford University Press, 2001. Page 211.

⁶⁹ **Oxford Paperback Dictionary Thesaurus and Wordpower Guide.** Oxford University Press, 2001. Page 964

⁷⁰ **Oxford Paperback Dictionary Thesaurus and Wordpower Guide.** Oxford University Press, 2001. Page 964

process can be dealt with through a normal EA process, such as that described by the MVRMA and implemented by the MVEIRB.

The consideration of culture in an EA process is more complicated. To thoroughly consider impacts to culture, the components that together contribute the most to, or help define “culture” need to be identified and separately evaluated. The components are:

- culture as defined by the biological environment;
- culture as defined by heritage resources;
- culture as defined by community values; and,
- culture as defined by the land and the landscape.

Standard EA and cumulative effects assessment procedures followed by the Review Board will provide an indication of whether or not culture is being impacted through any of these components. For example, where environmental impacts from a proposed development are identified and these impacts occur to any component of the biological environment, to heritage resources, to community values, or to the land and the landscape then it can be concluded that “culture” is also being impacted.

The questions that should be asked to help identify impacts to culture as defined by the biological environment, include:

- Will the biological component be affected to the point that it will interfere with the ability to continue with a cultural pursuit, such as hunting, trapping, fishing and berry picking?
- What is the desire to continue with these pursuits?
- Project impacts on harvested resources or harvest activities will have an impact on social cohesion. Is that the case with these developments? Is it to the extent that it interferes with the harvest activity?

Impacts to culture as defined by heritage resources can be identified through standard EA and cumulative effects assessment. However, what the heritage resources say about the land use and how the land was used, needs to be considered. Heritage resources provide an indication of the history of an area, a history of life on the land and in the landscape. Ultimately, heritage resources convey culture. The questions that should be asked include:

- Does this heritage resource convey information about culture or use of the local biological resources?
- How old is the resource – pre-contact or post contact?

⁷¹ Letter dated June 30, 2003 to the MVLWB from the Yellowknives Dene First Nation.

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- Is it from the existing culture?
- How will impacting or removing a heritage resource change the landscape and the story that it tells about the culture?

Community values relate to care of the land, environmental health, respecting nature, and continuing a traditional lifestyle as a cultural pursuit available for future generations. The questions that should be asked impacts to culture as defined by community values, include:

- How will the short and long term impacts on the environment from the proposed development affect individual and community lifestyles?
- How will potential changes in lifestyles affect community wellness?
- How will changes in community wellness and changes in the environment affect cultural and traditional lifestyles of current and future generations?

Impacts to culture as defined by the land and the landscape can also be identified through standard EA and cumulative effects assessment. The land and the landscape are inextricably linked to the spiritual resources of the people (i.e., the Yellowknives and the North Slave Metis). Culture in this case relates to the stories the land holds, and may be conveyed through traditional place names. The culture may also come out in the creation stories, such as “at this rock, this happened...”. In this context, the questions that should be asked include:

- How do the changes to the land and the landscape affect the stories that are told?
- How do the changes to the land and the landscape affect the cultural and spiritual values?
- Will loss of access to the land affect the cultural and spiritual values?
- Will culture ultimately be affected, by a change in the relationship to the land?
- How much change can the land undergo until it does not say anything more about the culture?

Areas of potential cumulative effects to VECs were previously identified (see Table 17). Based on these potential cumulative effects, and utilizing the results of the EA to be completed by the Review Board, the above questions can be asked.

Determining the significance of any identified impacts to the VECs will require the use of indicators, a commonly used method of measuring whether or not an impact is occurring. Table 18 lists the indicators considered appropriate in this circumstance.

Table 18. VEC indicators of significance (adapted from Larcombe 2000)

Valued environmental component	Attached social or cultural value	Significant impact indicators
Caribou	<ul style="list-style-type: none"> • Source of food. • Source of clothing. • Source of shelter. 	<ul style="list-style-type: none"> • Decline of relative numbers. • Shifting from migratory path. • Change in behaviour. • Loss of access (interference) to or additional energy expended to access caribou. • Loss of teaching or recreational opportunity. • Increased reliance on “store-bought” food.
Moose	<ul style="list-style-type: none"> • Source of food. • Source of clothing. 	<ul style="list-style-type: none"> • Decline of relative numbers. • Loss of access (interference) to moose, or additional energy expended to access moose. • Loss of teaching or recreational opportunity. • Increased reliance on “store-bought” food.
Fur bearers	<ul style="list-style-type: none"> • Source of clothing. • Source of income. 	<ul style="list-style-type: none"> • Decline of relative numbers. • Loss of access (interference) or additional energy expended to access hunting areas. • Loss of income. • Loss of teaching or recreational opportunity.
Waterfowl	<ul style="list-style-type: none"> • Source of food. 	<ul style="list-style-type: none"> • Decline of relative numbers. • Loss of access (interference) or additional energy expended to access hunting areas. • Loss of teaching or recreational opportunity. • Increased reliance on “store-

Valued environmental component	Attached social or cultural value	Significant impact indicators
Fish	<ul style="list-style-type: none"> • Source of food. 	<p>bought” food.</p> <ul style="list-style-type: none"> • Decline of relative numbers. • Loss of access (interference) or additional energy expended to access fishing areas. • Loss of teaching or recreational opportunity. • Increased reliance on “store-bought” food.
Plant – medicinal	<ul style="list-style-type: none"> • Source of medicine 	<ul style="list-style-type: none"> • Direct loss of plant. Need to find new source. • Loss of access to medicinal plant locations • Loss or weakening of traditional medicine practice. • Loss of teaching or recreational opportunity.
Plant – food	<ul style="list-style-type: none"> • Source of food 	<ul style="list-style-type: none"> • Loss of access to food source. • Loss or weakening of traditional food use. • Loss of teaching or recreational opportunity.
Plant – shelter	<ul style="list-style-type: none"> • Source of shelter making material 	<ul style="list-style-type: none"> • Loss of teaching or recreational opportunity.
Plant – tools	<ul style="list-style-type: none"> • Source of tool making material 	<ul style="list-style-type: none"> • Loss of teaching or recreational opportunity.
Heritage resources	<ul style="list-style-type: none"> • Source of culturally important information. • Helps define culture. 	<ul style="list-style-type: none"> • Reduction or loss in the use of traditional place names • Reduction or loss of language. • Direct disturbance or loss of heritage resources. • Loss of teaching opportunity.

Valued environmental component	Attached social or cultural value	Significant impact indicators
Spiritual areas	<ul style="list-style-type: none"> Helps define culture and links to the land. Stories about the land. Place names. 	<ul style="list-style-type: none"> Change in landscape (disturbance or loss). Loss of access to the land. Loss of teaching opportunity.

This table demonstrates the linkages between the identified VECs, the social and cultural value associated with each VEC, and the indicators of significance when a VEC is impacted. In order for a significance determination to be made regarding impacts to social and cultural resources, the Review Board would have to demonstrate one or more indicators of significant impact.

It is recognized that the linkages described between the land and the landscape and culture, heritage resources and culture, and biological environment and culture considered here are not complete. What is lacking is the input of the traditional users of the Regional Study Area, traditional knowledge and further scoping of the whole relationship between social, cultural and heritage resources. However, for the purposes of this project, and the EA of the developments before the Review Board, this tool in its current state, will provide effective assistance.

4.7 Regional Considerations

In order to evaluate the potential cumulative impacts on cultural and heritage resources in the proper regional context, it will be necessary for the Review Board to take into account the traditional territory of the First Nations that use the Regional Study Area. For ease of representation and discussion, the traditional territory of the Yellowknives was selected (see Figure 2) though it is known that other First Nations also use the area.

The VECs that require a greater regional consideration⁷² of potential impacts are: caribou, moose, some fur bearers (i.e., those species who have home ranges greater than the Regional Study Area), waterfowl, fish and spiritual resources. Of these, only caribou and spiritual resources will be considered here. For the remaining VECs, there is insufficient information to give proper consideration for this exercise.

⁷² Greater regional consideration refers to considering other impacts to the VEC that occur outside of the Regional Study Area for this project.

4.7.1 Caribou

The range of the Bathurst Caribou was previously discussed in section 4.3.3 of this report. Within this home range there are other developments occurring, such as the Ekati and Diavik diamond mines, and the winter road construction and operation.

The Review Board made the following conclusions with respect to development impacts on caribou during the recent De Beers Snap Lake Diamond Project environmental assessment:

“Consequently, the Board concludes that significant impacts on caribou movement and behaviour could result from the development of the [Snap Lake Diamond Mine]. The Board notes however that the number of caribou affected could vary widely from year to year.”⁷³

“In the opinion of the Board, the weight of evidence suggests subtle changes may already be occurring in the environment and on caribou movement. Impacts on foraging behaviour may influence the energetic balance of individual caribou, and consequently overall population dynamics, if the duration and number of affected individuals is great. Impacts on movement patterns have the potential to influence both caribou energetics and community hunting opportunities if large changes in movement pattern occur.”⁷⁴

“The weight of evidence suggests subtle changes are already occurring in the environment and caribou movement patterns, and that continued disturbance of caribou migratory habitat may likely result in a significant cumulative effect in the future.”⁷⁵

“These conclusions notwithstanding, the Board is of the view that the potential for significant adverse cumulative effects exists.”⁷⁶

These conclusions strongly suggest that environmental changes caused by developments have already affected the caribou, even to the extent of potentially causing significant adverse cumulative effects. These impacts not only affect the caribou directly as a renewable resource, but they also extend to affecting traditional lifestyle, and therefore ultimately cultural and spiritual resources of the Dene, including the Yellowknives, and the Metis.

⁷³ Page 124, **Report of EA and Reasons for Decision on the De Beers Snap Lake Diamond Project**, prepared by the MVEIRB, July 25, 2003.

⁷⁴ Page 158, **Report of EA and Reasons for Decision on the De Beers Snap Lake Diamond Project**, prepared by the MVEIRB, July 25, 2003.

⁷⁵ Page 159, **Report of EA and Reasons for Decision on the De Beers Snap Lake Diamond Project**, prepared by the MVEIRB, July 25, 2003.

⁷⁶ Page 159, **Report of EA and Reasons for Decision on the De Beers Snap Lake Diamond Project**, prepared by the MVEIRB, July 25, 2003.

4.7.2 Spiritual Areas

The traditional land use area of the Yellowknives is approximately 87,154 square kilometres, and is illustrated in Figure 2 of this report. As previously demonstrated, cultural values are closely linked to the land, and to biological and heritage resources. The identified VECs are integral components of culture, of which spiritual areas is one VEC closely linked to the land and the landscape.

Within the traditional territory of the Yellowknives, there is already a considerable amount of development and other activities that are occurring (Table 19). Each of these developments and activities are, within their own footprint of impact, affecting the land and the landscape and even influencing other VECs, such as caribou.

Table 19. Some of the Land Use Activities within the traditional use area of the YKDFN.

ACTIVITY	ESTIMATED NUMBER
Active Mines	3, 1 pending
Inactive Mines	19
Mineral Leases	25
Drill Sites	8
Winter Roads (Active)	15
All Weather Roads (excluding within settlements)	7
Airstrip	5
Navigational Aids	2
Lodges and Hunt Camps	17
Territorial Parks	11
Cottages/Cabins	N/A
Fuel Caches	N/A

N/A = information not available

In addition to the land use activities listed above, there are other activities occurring in this area that are not quantifiable, such as sports hunting, sports fishing, canoeing and camping. All these activities would utilize the land and some of the resources in some way.

The effects of many developments and other activities occurring in the traditional land use area of the Yellowknives, combined with the proposed developments in the Regional Study Area, need to be considered for any cumulative effects assessment completed by the Review Board on the four developments proposed for the Drybones Bay and Woll Bay areas.

The Review Board may also wish to consider any potential biophysical environmental impacts in the context of growth and recovery rates of renewable resources. The long cold winters that are typical in the Regional Study Area and in the traditional land use area of the Yellowknives, results in slower growth rates of renewable resources. An example of slower growth rates in fish, compared to more moderate climate areas, is shown in Figure 7.

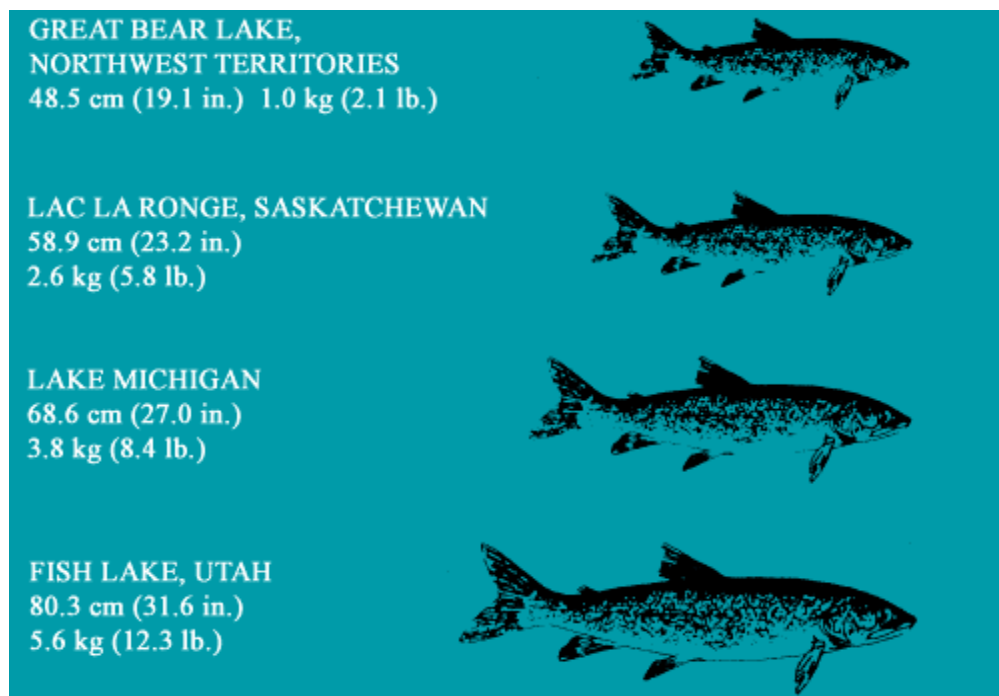


Figure 7. Fish grow slowly in cold northern waters, as this comparison of a ten-year-old lake trout shows⁷⁷.

This example illustrates there is a vast difference between growth rates in fish from northern and southern waters, which results in an extremely slow replacement rate of fish in northern water. In considering impacts to fish and other renewable resources, rates of growth and replacement rate should also be factored in to any significance determination.

⁷⁷ Source: http://www.nwtwildlife.rwed.gov.nt.ca/fishing/fish_growth.htm

5 Proposed Mitigation for Combined Developments

In the submitted DARs, developers were required to identify specific issues that they had identified and their response, or mitigation to those issues (Tables 20 – 23).

Table 20. Consolidated Goldwyn Ventures identified issues and proposed resolution

Issue	Resolution
Culturally vital: many residents grew up and spent summers in the area and continue to actively use area.	Issue as stated indicates predominantly a summer concern and usage; most of program conducted in winter would be confined to an area on ice, offshore of any area that would have had normal human activity: therefore, spatially, program area does not conflict with referenced area of concern, timing of program does not conflict with any summer activities in the area, and the program duration is so short that any winter activities would not be compromised.
Spiritually Significant areas	Spatially, the program areas are small and would not conflict with referenced areas of concern; no archaeological sites were identified by Prince of Wales North Heritage Centre within 1 km of the work areas; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be will be respected.
Numerous grave sites along Drybones Bay	Spatially, the program areas are small and would not conflict with referenced area of concern; no archaeological sites were identified by Prince of Wales North Heritage Centre within 1 km of the work areas; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be will be respected.
Actively used for hunting	Program would be conducted in winter.. Program duration is short and no effects on wildlife or hunting are anticipated.
Actively used for fishing	Program would be conducted in winter and confined to limited areas on ice, well offshore.. Program duration is short. Cuttings will be contained and transported to Yellowknife landfill site Fish harvesting by local business is 45km away from site and is not active during winter months.
Actively used for trapping	Program would be conducted in winter. Program duration is short and no effects on wildlife or trapping are anticipated.
Actively used for berry picking	Program would be conducted in winter.. Program duration is short and no effects on vegetation are anticipated. Program is not conducted during berry picking time.

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Issue	Resolution
Site of Bald eagles (raptors))	Program would be conducted in winter when eagles and most other birds are not present. Program duration is short and no effects on birds are anticipated,
Actively used for camping and campground areas	Issue as stated indicates predominantly a summer concern and usage; Program would be conducted in winter.
Actively used for goose hunting	Program would be conducted in winter when geese and most other birds are not present. Program duration is short and no effects on birds are anticipated Summer goose hunting will not be affected.
Actively used for duck hunting	Program would be conducted in winter when ducks and most other birds are not present. Program duration is short and no effects on birds are anticipated Summer duck hunting will not be affected.
Ecologically unique because they are the largest bays on the shoreline and provide a unique microclimate and unique ecosystem.	Program would be conducted in winter.. Program duration is short and no effects on wildlife, vegetation or ecologically unique areas are anticipated.
Unique habitat makes it excellent for wildlife	Program would be conducted in winter.. Program duration is short and no effects on wildlife, vegetation or ecologically unique wildlife habitats are anticipated.
Sheltered bays are regularly used during lake travel (impact current use and activity patterns)	Ice road built by and for exploration companies and their program, traffic use would be minimal, 3-4 trips per day; no spatial overlapping conflict; for the short duration of program drill rig and traffic could potentially be a benefit to other users caught in bad weather conditions.
Good places for picking medicinal plants	Program would be conducted in winter. No land would be disturbed so could not disturb any medicinal plant growth and program not conducted during medicinal plant harvesting time. No spatial overlapping conflict seen.
Main boat moorage on Windy days	Program would be conducted in winter so there would not be any boating conflict;. No overlapping conflict occurs.
Significant impact on Treaty rights and alienation of current access to the land	Issue being addressed by government
Forest Resource impact-all trees getting knocked down	Travel and work area would be conducted in a workman like way so to minimize the cutting of trees,
Sound effects of wildlife	Duration of program would be short to minimize any impact, not immediate site of wildlife, most wildlife hibernating during program.
Improved Access	Winter road would be open only during program. Without constant plowing ice road covers over in a couple of days of windy conditions. Ice road would be completely gone when ice melts. Therefore, there is no improved access

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Issue	Resolution
	except for this short duration and is not a normal route for others. Most would have same access with skidoo anytime regardless of program an ice road.

Table 21. New Shoshoni identified issues and proposed resolution.

Issue	Resolution
Culturally vital: many residents grew up and spent summers in the area and continue to actively use area.	Issue as stated indicates predominantly a summer concern and usage; program conducted in winter would mostly be confined to an area offshore of any area that would have had normal human activity: therefore, spatially, program area does not conflict with referenced area of concern, timing of program does not conflict with any summer activities in the area, and the program duration is so short that any winter activities would not be compromised. New Shoshoni will monitor work area to ensure that all sites will be will be respected. Company will be using First Nation advisors to ensure no interference.
Spiritually Significant	Spatially the program areas are small and would not conflict with referenced areas of concern; the archaeological sites identified by YKDFN and the Prince of Wales North Heritage Centre within 1 km of the will be respected and local community sources will be consulted to provide any information to ensure that all sites will be will be respected. Company will be using First Nation advisors to ensure no interference.
Numerous grave sites along Drybones Bay	Spatially the program areas are small and would not conflict with referenced areas of concern; the archaeological sites identified by YKDFN and the Prince of Wales North Heritage Centre within 1 km of the will be respected and local community sources will be consulted to provide any information to ensure that all sites will be will be respected. Company will be using First Nation advisors to ensure no interference
Actively used for hunting	Program will be conducted in winter. Program duration is short and no effects on wildlife or hunting are anticipated.
Actively used for fishing	Program will be conducted in winter and confined to limited areas on the ice. Program duration is short and cuttings will be contained and deposited on shore Fish harvesting by local business is 45km away from site and is not active during winter months.
Actively used for trapping	Program will be conducted in winter. Program duration is short and no effects on wildlife or hunting are anticipated.
Actively used for berry	Program will be conducted in winter. Program duration is short and no

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Issue	Resolution
picking	effects on vegetation are anticipated. Program is not conducted during berry picking time.
Site of Bald eagles (raptors)	Program would be conducted in winter when eagles and most other birds are not present. Program duration is short and no effects on birds are anticipated
Actively used for camping and campground areas	Issue as stated indicates predominantly a summer concern and usage; Program would be conducted in winter
Actively used for goose hunting	Program would be conducted in winter when geese and most other birds are not present. Program duration is short and no effects on geese or other birds are anticipated
Actively used for duck hunting	Program would be conducted in winter when ducks and most other birds are not present. Program duration is short and no effects on ducks or other birds are anticipated
Ecologically unique because they are the largest bays on the shoreline and provide a unique microclimate and unique ecosystem.	Program would be conducted in winter.. Program duration is short and no effects on wildlife, vegetation or ecologically unique areas are anticipated.
Unique habitat makes it excellent for wildlife	Program would be conducted in winter.. Program duration is short and no effects on wildlife, vegetation or ecologically unique areas are anticipated.
Sheltered bays are regularly used during lake travel (impact current use and activity patterns)	Ice road built by and for exploration companies and their program, traffic use would be minimal, 3-4 trips per day;, no spatial overlapping conflict; for the short duration of program drill rig and traffic could potentially be a benefit to other users caught in bad weather conditions.
Good places for picking medicinal plants (not sure this pertains to Wool Bay)	Program would be conducted in winter. No land would be disturbed so could not disturb any medicinal plant growth and program not conducted during medicinal plant harvesting time. No spatial overlapping conflict seen.
Main boat moorage on Windy days	Program would be conducted in winter so there would not be any boating conflict. No overlapping conflict occurs.
Significant impact on Treaty rights and alienation of current access to the land	Issue being addressed by government
Forest Resource impact-all	Travel and work area would be conducted in a workman like way so to

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Issue	Resolution
trees getting knocked down	minimize the cutting of trees,
Sound effects of wildlife	Duration of program would be short to minimize any impact, not immediate site of wildlife. Most wildlife are hibernating during program.
Improved Access	Winter road would be open only during program. Without constant plowing ice road covers over in a couple of days of windy conditions. Ice road would be completely gone when ice melts. Therefore, there is no improved access except for this short duration and is not a normal route for others. Most would have same access with skidoo anytime regardless of program an ice road.

Table 22. North American General Resources Corporation identified issues and proposed resolution.

Issue	Resolution
Culturally vital: many residents grew up and spent summers in the area and continue to actively use area.	Issue as stated indicates predominantly a summer concern and usage; program conducted in winter would be confined to an area of 200m x 200m exclusively on ice and 250m offshore and would not have had normal human activity: therefore, spatially, program area does not conflict with referenced area of concern, timing of program does not conflict with any summer activities in the area, and the program duration is so short that any winter recreation activities would not be compromised. No remnant impact to area affecting continued use.
Spiritually Significant (uncertain if concern pertains to Wool Bay or Drybones Bay)	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and would not have had normal human activity. Access to work area would be along ice road. Therefore, spatially, program area is small and would not conflict with referenced area of concern; no archaeological sites were identified by Prince of Wales North Heritage Center within 1 km of the work area but 1 site lies about 3km from the work area; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be respected and avoided. No remnant impact to area.
Numerous grave sites at the bay and along shoreline (uncertain if this pertains to Drybones Bay only)	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and would not have had normal human activity. Access to work area would be along ice road. Therefore, spatially, program area is small and would not conflict with

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Issue	Resolution
	referenced area of concern; no archaeological sites were identified by Prince of Wales North Heritage Center within 1 km of the work area but 1 site lies about 3km from the work area; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be respected and avoided. No remnant impact to area.
Actively used for hunting	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore in an exposed area that would not provide any significant habitat for wildlife. Furthermore, program duration is short to minimize any negligible impact on hunting. No remnant impact to area or future hunting.
Actively used for fishing	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice. Temporary localized noise disturbance in area. Drill cuttings will be removed to minimize impact and used water would be pumped on shore. Program would not have any significant impact beyond negligible temporary and local disturbance to fish. Fish harvesting by local business is 5km away from site and is not active during winter months. No remnant impact to area or future fishing.
Historical village at Wool Bay	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and would not have had normal human activity. Access to work area would be along ice road. Therefore, spatially, program area is small and would not conflict with referenced area of concern; no archaeological sites were identified by Prince of Wales North Heritage Center within 1 km of the work area but 1 site lies about 3km from the work area; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be respected and avoided.
Actively used for trapping	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore in an exposed area that would not provide any significant habitat for wildlife. No trapping occurs on the lake ice. No remnant impact to area or future trapping.
Actively used for berry picking	Program conducted in winter would be confined to an area of 200m x 200m exclusively on ice and 250m offshore. Therefore, spatially, the program area does not conflict with berry harvesting; timing of program does not conflict with any summer berry harvesting activities in the region. No remnant impact to area or future berry picking.
Site of Bald eagles (raptors) (not sure if this pertains to	Program area is 250m offshore of Great Slave Lake, centered on whale-back shaped and treed island, site visit by author in July 2002 and April

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Issue	Resolution
Wool Bay)	2003 did not identify nesting area on island or shoreline. Duration of program and not conducted during spring/summer nesting period. Bald eagles not present at time of program due to migration south. No remnant impact to area or eagles.
Actively used for camping and campground areas	Issue as stated indicates predominantly a summer concern and usage; program conducted in winter would be confined to an area of 200m x 200m on ice and 250m offshore that would not draw normal camping activity. Therefore, spatially, program area does not conflict with referenced area of concern, timing of program does not conflict with any summer activities in the area, and the program duration is so short that any negligible winter camping activities would not be compromised. No remnant impact to area or future camping activities.
Actively used for goose hunting	Program conducted in winter and exclusively on ice so no perceivable conflict with geese that are absent from the area at this time of year. Nearest marshland that could provide spring/summer habitat is at least 800m northeast of work area on the other side of a projecting peninsula of land. No remnant impact that would affect future summer goose hunting.
Actively used for duck hunting	Program conducted in winter and exclusively on ice so no perceivable conflict with ducks that are absent from the area at this time of year. Nearest marshland that could provide spring/summer habitat is at least 800m northeast of work area on the other side of a projecting peninsula of land. No remnant impact that would affect future summer duck hunting.
Ecologically unique because they are the largest bays on the shoreline and provide a unique microclimate and unique ecosystem.	Program not in Wool Bay proper; Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and does not provide any significant habitat for wildlife. Program conducted in winter, of short duration and on ice so no perceivable conflict. No remnant impact to area.
Unique habitat makes it excellent for wildlife	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and does not provide any significant habitat for wildlife. Program conducted in winter, of short duration and on ice so no perceivable conflict. No remnant impact to area for future wildlife use.
Sheltered bays are regularly used during lake travel (impact current use and activity patterns)	Ice road built by and for exploration companies and their program, traffic use would be minimal, 3-4 trips per day; Wool Bay proper is not the location of the program, no spatial overlapping conflict; for the short duration of program drill rig and traffic could potentially be a benefit to other users caught in bad weather conditions. Access route would not

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Issue	Resolution
	conflict with skidoo usage.
Good places for picking medicinal plants (not sure this pertains to Wool Bay)	Program conducted in winter would be confined to an area of 200m x 200m exclusively on ice and 250m offshore. Therefore, spatially, program area does not conflict with medicinal plant harvesting; timing of program does not conflict with any summer medicinal plant harvesting activities in the region. No remnant impact to area or future medicinal plant habitat or harvesting. No spatial overlapping conflict seen.
Main boat moorage on Windy days	Program would be conducted in winter so there would not be any boating conflict; program not in Wool Bay proper. No overlapping conflict occurs.
Wool Bay birth place of many current residents of Dettah and Ndilo	Program would be conducted in winter and confined to an area of 200m x 200m exclusively on ice and 250m offshore and would not have had normal human activity. Access to work area would be along ice road. Therefore, spatially, program area is small and would not conflict with referenced area of concern; no archaeological sites were identified by Prince of Wales North Heritage Center within 1 km of the work area but 1 site lies within 3km of the work area; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be respected and avoided.
Significant impact on Treaty rights and alienation of current access to the land	Not an environmental Impact issue.
Forest Resource impact-all trees getting knocked down	Travel and work area would be conducted exclusively on lake ice in an area of 200m x 200m. No cutting of trees needed, no trees impacted.
Sound effects on fish and wildlife for year round sound.	Duration of program would be short to minimize any negligible impact, site does not provide good habitat for wildlife, most wildlife hibernating, migrated or in land during program. Depth of water in area is 1-6 m. The depths of ice development may be right to bottom thus not providing winter fish habitat. Any impact on fish and wildlife would be negligible.
Improved Access	Winter road would be open only during program. Without constant ploughing ice road covers over in a couple of days of windy conditions. Ice road would naturally disappear when ice melts. Therefore, there is no improved access except for this short duration and is not a normal route for others. Most would have same access with skidoo anytime regardless of program and ice road.

Table 23. Snowfield Development Corporation identified issues and proposed resolution.

Issue	Resolution
Culturally vital: many residents grew up and spent summers in the area and continue to actively use area.	Issue as stated indicates predominantly a summer concern and usage; Snowfield’s consultant (see below) indicates only 3 areas of significance in vicinity of claims but not on them. Company will continue using First Nation advisors to ensure no areas disturbed
Spiritually Significant	No archaeological sites were identified by Prince of Wales North Heritage Centre; local community sources have not provided any information as yet but should information be provided we will ensure that all sites will be respected. Company will continue using First Nation advisors to ensure no areas disturbed
Numerous grave sites at the bay and along shoreline	Company will ensure access to work area would ensure that all sites will be respected.
Actively used for hunting	Company will continue using First Nation advisors to ensure no interference.
Actively used for fishing	Company will continue using First Nation advisors to ensure no interference
Actively used for trapping	Company will continue using First Nation advisors to ensure no interference.
Actively used for berry picking	Company will continue using First Nation advisors to ensure no interference
Site of Bald eagles (raptors)	During the summer component of the exploration program Snowfield will monitor and minimize any noise or conflict, during nesting period.
Actively used for camping and campground areas	Issue as stated indicates predominantly a summer concern and usage; Company will continue using First Nation advisors to ensure no interference
Actively used for goose hunting	Company will continue using First Nation advisors to ensure no interference
Actively used for duck hunting	Company will continue using First Nation advisors to ensure no interference No remnant impact that would affect summer duck hunting.
Ecologically unique because	Program not in Bay areas proper; Company will continue using First

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Issue	Resolution
they are the largest bays on the shoreline and provide a unique microclimate and unique ecosystem.	Nation advisors to ensure no interference
Unique habitat makes it excellent for wildlife	Program not in Bay areas proper; Company will continue using First Nation advisors to ensure no interference
Sheltered bays are regularly used during lake travel (impact current use and activity patterns)	Program not in Bay areas proper; Company will continue using First Nation advisors to ensure no interference
Good places for picking medicinal plants	No land would be disturbed so could not disturb any medicinal plant growth. Company will continue using First Nation advisors to ensure no interference
Main boat moorage on Windy days	Program not in Bay areas proper;
Significant impact on Treaty rights and alienation of current access to the land	Not an environmental Impact issue.
Forest Resource impact-all trees getting knocked down	Travel and work area would be conducted in a workman like way so to minimize the cutting of trees,
Sound effects of wildlife	During the exploration program Snowfield will minimize any noise or conflict on wildlife.

Given the different locations and scope of each of the developments, there is little opportunity for combining mitigation measures to further reduce potential environmental impacts. The major components of the proposed developments are identified in the following tables, and combined mitigation opportunities have been identified (Tables 24 – 27).

Table 24. Consolidated Goldwin Ventures Inc. impacts and proposed mitigation measures

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
Winter access road, allowing increased access by other users.	An ice road will be constructed from Yellowknife to the Drybones Bay area (and to Hearne Channel area) and would be used by CGV for the duration of its drilling program. The ice road will be constructed in accordance with existing NWT guidelines for the construction, maintenance and closure of winter roads.	One ice road would be used by all four developers for access to the Drybones Bay and Wool Bay areas.
Camp – size, location, duration, waste disposal	No camp will be required to support the planned drilling program.	Possible to share Dave Smith permitted camp located on the east side of Drybones Bay.
Drilling – waste disposal, water use, disturbance of archaeological, cultural, or historical sites.	Two drill sites located offshore, requiring on-ice drilling. Large diameter casing installed from water surface to lake bottom to prevent loss of drilling fluids and drill cuttings to the water column. Approximately 25,000 litres required to drill each hole; water to be re-circulated for drilling to reduce amount used. Drilling is short-term, winter based and offshore, and therefore does not affect archaeological, cultural or historical sites. Used water and drill cuttings will be contained and returned to Yellowknife for disposal in an approved manner.	N/A
Waste management	The primary wastes generated by the drilling program include drill cuttings, drilling fluids, general garbage (empty fuel drums, food containers and drill mud constituent bags). All wastes, including water and drill cuttings, will be contained and removed to Yellowknife for recycling or disposal in an approved manner.	N/A

Table 25. New Shoshoni Ventures impacts and proposed mitigation measures

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
Winter access road, allowing increased access by other users.	An ice road will be constructed from Yellowknife to the Drybones Bay area and would be used by NSV for the duration of its drilling program. The ice road will be constructed in accordance with existing NWT guidelines for the construction, maintenance and closure of winter roads.	One ice road would be used by all four developers for access to the Drybones Bay and Wool Bay areas.
Camp – size, location, duration, waste disposal	A camp will be required to support the planned drilling program, and is located on the east side of the small bay where drilling will take place in Drybones Bay. This camp has been previously established and permitted.	N/A
Drilling – waste disposal, water use, disturbance of archaeological, cultural, or historical sites.	For offshore, on-ice drilling sites: Large diameter casing installed from water surface to lake bottom to prevent loss of drilling fluids and drill cuttings to the water column. Approximately 25,000 litres required to drill each hole; water to be re-circulated for drilling to reduce amount used. On-shore drilling will also collect drill cuttings and drill fluids. Used water and drill cuttings will be contained and disposal in an approved manner on land. Total amount of drill cuttings generated are 2.5 to 5.0 cubic metres.	N/A
Waste management	The primary wastes generated by the drilling program include drill	N/A

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
	cuttings, drilling fluids, general garbage (empty fuel drums, food containers and drill mud constituent bags). All wastes will be contained and removed to Yellowknife for recycling or disposal in an approved manner. Drill fluids and drill cuttings will be disposed of on land in an approved manner.	

Table 26. North American General Resources Corporation impacts and proposed mitigation measures

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
Winter access road, allowing increased access by other users.	An ice road will be constructed from Yellowknife to the Drybones Bay area and would be used by NAGRC to access their Wool Bay property, by a 300 – 400 metre access spur, for the duration of its drilling program. The ice road will be constructed in accordance with existing NWT guidelines for the construction, maintenance and closure of winter roads.	One ice road would be used by all four developers for access to the Drybones Bay and Wool Bay areas. A 300 to 400 metre access spur will be required to access the NAGRC site.
Camp – size, location, duration, waste disposal	No camp will be required to support the planned drilling program. Crews will travel daily to the site from Yellowknife.	N/A
Drilling – waste disposal, water use, disturbance of archaeological, cultural, or historical sites.	For offshore, on-ice drilling a Poly-drill system will be used to collect water and drill cuttings and prevent loss of drilling fluids and drill cuttings to the water column. A total of approximately 3,000 gallons of water is required to drill all three holes; water to be re-circulated for drilling to reduce amount used.	N/A

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Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
	Drill water to be replaced every 1.5 days. Used drill water to be disposed of on land, at least 30 metres from shore. Drill cuttings will be contained, removed to Yellowknife and disposal in an approved manner. Daily amount of drill cuttings generated are between 0.2 and 0.5 cubic metres.	
Waste management	The primary wastes generated by the drilling program include drill cuttings, drilling fluids, general garbage (empty fuel drums, food containers and drill mud constituent bags). All wastes, including drill cuttings, will be contained and removed to Yellowknife for recycling or disposal in an approved manner. Drill fluids will be disposed of on land in an approved manner.	N/A

Table 27. Snowfield Development Corporation impacts and proposed mitigation measures

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
Winter access road, allowing increased access by other users.	An ice road will be constructed from Yellowknife to the Drybones Bay area and would be used by Snowfield for the duration of its winter exploration programs. The ice road will be constructed in accordance with existing NWT guidelines for the construction, maintenance and closure of winter roads. Summer access will be by helicopter and/or fixed wing aircraft.	One ice road would be used by all four developers for access to the Drybones Bay and Wool Bay areas.
Camp – size, location, duration, waste disposal	A semi-permanent camp and equipment storage/staging area is proposed/located approximately 4 KM south of Drybones Bay	N/A

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
	and 75 metres back from the shore of Great Slave Lake. This camp facility has been previously established and permitted. The camp will accommodate up to 20 people.	
Drilling – waste disposal, water use, disturbance of archaeological, cultural, or historical sites.	Drilling is all land based, using from 1 to 30 sites and drilling between 1 to 20 drill holes per site (depending on the claim) to depths up to 200 metres. Up to 25,000 litres of water will be used per drill hole. Drilling fluid and drill cuttings will be collected and disposed of in approved land based sumps.	N/A
Waste management	The primary wastes generated by the drilling program include drill cuttings, drilling fluids, general garbage (empty fuel drums, food containers and drill mud constituent bags). All wastes, except drill fluids and cuttings, will be contained and removed to Yellowknife for recycling or disposal in an approved manner. Drill fluids and drill cuttings will be disposed of on land in an approved manner.	N/A
Gridline cutting	Gridline cutting will occur on the Mud Lake, Hurcomb, Red and GTEN 16 claims. Gridline widths will be minimal, to allow portable drill rig access. Removal of large diameter trees will be avoided. This work completed without the need for a Land Use Permit.	N/A
Geochemical till sampling	Soil/till sampling will occur in grid areas. Overburden will be removed and stored for later rollback. Most of this work completed without the need for a Land Use Permit.	N/A
Kimberlite bulk sampling	One bulk kimberlite sample is proposed to be taken from a previously identified kimberlite on the Mud Lake claim. The trenching method of bulk sample will be used. Overburden will be removed and stored for later rollback. This bulk sample will be	N/A

Regional Cumulative Effects Study: Drybones Bay and Wool Bay

Identified Impact(s)	Proposed Mitigation	Possible or Proposed Combined Mitigation with other Developers
	undertaken with an amendment to any existing Land Use Permits issued for this current development.	

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Appendices

Appendix A

Terms of Reference

FINAL TERMS OF REFERENCE AND SCHEDULE

FOR THE

CUMULATIVE EFFECTS STUDY

OF THE DRYBONES BAY/WOOL BAY AREA

July 23, 2003

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1 INTRODUCTION

Background

Diamondiferous kimberlite has been found in the Drybones Bay/Wool Bay Area. Increased development referrals to the Mackenzie Valley Environmental Impact Review Board (MVEIRB) indicate concerns about potential cumulative effects to the area. These concerns have highlighted the need for decision-making tools suited to the identification, evaluation and mitigation of potential cumulative effects.

Cumulative effects are difficult to recognize on project-specific applications for authorizations due to narrow project scoping. The effects of multiple developments in close proximity or reliant on shared infrastructure or access can only be assessed through a broader approach. The MVEIRB is made aware of potential cumulative effects through the expression of concerns by parties about the social, cultural and environmental quality of an area. This analysis can be difficult in areas without a land use plan, where development priorities have not been established.

The MVEIRB, in the absence of planning instruments for the Drybones Bay/Wool Bay Area, must consider “the impact of the development on the environment, including the impact of malfunctions or accidents that may occur in connection with the development and any cumulative impact that is likely to result from the development in combination with other developments” (*MVRMA*, S.117 (2) (a)). The Board must recognize potential land use conflicts that may change magnitude and significance of an impact and provide recommendations to minimize cumulative effects.

The Drybones Bay/Wool Bay area is recognized as being of vital importance to Aboriginal and non-Aboriginal residents in and around Yellowknife. There is an immediate need for a decision-making instrument to help the MVEIRB to make decisions about potential cumulative effects that provides an understanding of:

- social, cultural and environmental sensitivities in the Drybones Bay/Wool Bay Area;
- level of uncertainty associated with sensitive and/or highly-valued areas;
- current and foreseeable development; and
- an evaluation of the area for potentially significant impacts due to cumulative effects.

Purpose

The purpose of this project is to develop a decision-making tool to help the MVEIRB to better make decisions about development’s contribution to potential cumulative effects and to make effective recommendations for development in the Drybones Bay/Wool Bay Area.

This study will occur concurrently with four Environmental Assessments (EAs) of proposed developments in the Drybones Bay/Wool Bay Area. This will allow the Board to focus the public hearing for all EAs and provide needed baseline information to help all parties preparing evidence.

This study is being shared with all parties and will be subject to the scrutiny of the parties should they wish to use some of its content in their evidence. The study is considered a technical study, supplementary to the environmental assessment.

2 TERMS OF REFERENCE

Overview

The Terms of Reference describes the scope of and factors to be considered in Cumulative Effects Study of Drybones Bay/Wool Bay. The Terms of Reference are designed to ensure the appropriate information is provided to understand the potential cumulative effects arising from current and proposed development in the Drybones Bay/Wool Bay Area.

Cumulative Impact Model

The contractor shall provide the Review Board with a decision-making instrument to aid in identifying likely (based on the balance of evidence) and significant adverse cumulative impacts. The contractor should:

- Identify existing and predicted land uses through literature review and interviews with industry associations and developers expected to operating or currently operating in the area (i.e., mineral exploration, timber harvesting, fishing, and tourism, as well as associated roads, cut lines, camps, sumps, etc.);
- Identify the valued social, cultural and environmental components that may be affected by development in combination with other human activities (i.e., spiritual sites, archaeological sites, important harvesting areas, rare species, and important wildlife and fish habitat);
- Identify the changes the predicted land use will produce in the quality of the social, cultural and natural environment of the Drybones Bay/Wool Bay Area;
- Identify the potential impacts of these stresses based on intensity (i.e., high, medium, low) and the level of certainty in predictions (i.e., confidence interval derived from a gap analysis and potential discrepancies between scientific and traditional knowledge) and other factors; and
- Compile the predicted impacts as well as the associated uncertainty on a map or series of maps.

The Contractor should, to the extent possible, consider reasonably foreseeable development in the Drybones Bay/Wool Bay Area.

Information Sources

The contractor is expected to access, at a minimum, the following information sources:

- Available literature, including material from previously conducted EAs or Preliminary Screenings in the area;
- A site visit to better understand the lay out and scale of the area of concern;
- Interviews with relevant territorial and federal government departments including but not limited to the Department of Resources, Wildlife, and Economic Development, Department of Fisheries and Oceans and Environment Canada that can provide biophysical information in the area;
- Interviews with industry associations and/or companies that are or may undertake developments in the area to map existing and reasonably foreseeable developments; and
- Speak with Aboriginal groups and traditional users of the area that indicated a concern about cumulative development impacts on social, culture and environmental condition of the Drybones Bay/Wool Bay area.

Deliverables

Upon completion of this project, the Contractor will provide:

- 1 hardcopy set of draft maps/sketch maps
- 1 hardcopy draft report
- 5 hardcopy sets of final map
- 5 hardcopies of final report
- 1 PDF copy of maps and report
- 1 digital copy of report in MS Word format
- 1 digital set of maps in format that can be edited, e.g. jpeg or tiff

It is recognized that it may not be possible to determine exact boundaries of impacts, impact sensitivity, valued components, or uncertainty levels. Sketch maps will generally be adequate. The level of uncertainty associated with boundaries should be stated on the maps and if possible, be incorporated into the map design.

The Review Board has pre-authorized a budget for this project. Although it is recognized that data sets and shape files may be acquired during the research, this information will not be analyzed using spatial analysis software. This information will be compiled and, with written permission of the agencies providing the data, will be shared with the parties to the environmental assessment.

The parties are welcome to use available data for their own analyses as part of their evidence to the Review Board at the Public Hearing.

3 WORK PLAN

This section summarizes the phases in this Cumulative Effects Study. This process must adhere to the schedule presented to avoid unnecessary delays in the EAs currently underway for developments in the Drybones Bay/Wool Bay Area. The study is a technical study to enhance the individual EAs, not as a replacement for these EAs.

Milestones and Responsibilities

Having considered the information available regarding this development, the Review Board has established milestones and responsibilities for this EA process. These milestones and responsibility assignments are outlined in Table 1.

Table 1 - Milestones and Responsibility Assignments for Phases in the EA Process

Milestone	Consultant	Stakeholders	Review Board and Staff
Contract initiation meeting to review and finalize the Terms of Reference and Work Plan	✓		✓
Literature Review and Gap Analysis	✓		✓
Site Visit	✓	✓	
Interviews with Government Departments	✓	✓	✓
Interviews with Industry Associations (tourism, forestry, fisheries, oil and gas, mining) and Developers	✓	✓	✓
Gather available traditional land use information	✓	✓	✓
Design Impact Decision Tools (maps) and draft Report	✓		
Revise Impact Decision Tools and Report	✓		✓
Presentation to the MVEIRB	✓		✓

Contract Initiation Meeting

The Review Board's Project Team will meet with the consultant to review the Terms of Reference and Work Plan. Deliverables, timelines and budgets will be reviewed to clarify expectations.

Deliverable: Finalized reporting structure, timeline and signed contract.

Literature Review and Gap Analysis

A literature review on available information sources pertaining to the Drybones Bay and Wool Bay Area will be undertaken. This review will characterize: the social, cultural and environmental importance of the study area. Upon completion of the literature review, the contractor will conduct a gap analysis that describes areas that are least well-understood in terms of their significance or are poorly documented. These areas represent uncertainties in the determination of impact significance.

Deliverable: A series of topics and questions to explore with traditional users of the Drybones Bay/Wool Bay Area as well as commercial users.

Site Visit

The contractor will arrange a site visit in the Drybones Bay/Wool Bay Area. The purpose of the site visit will be to better understand the scale and sensitivity of the area where the development is proposed.

Deliverable: Report of site visit.

Gather Traditional Land Use Information

The contractor will collect available information on importance of the area, or parts of the area, to the cultural, social and traditional activities of user groups from Aboriginal groups interested in participating in the study.

Deliverable: Report of information, sketch map depicting on social, cultural and environmental significance.

Interviews with Industry Associations and Developers

The contractor will interview industry associations and developers currently operating or planning to operate in the Drybones Bay/Wool Bay Area. The interviews will try to identify resource development potential to overlay on social, cultural and environmental attributes. The interviews will also try to identify potential for collaboration within industry to minimize environmental effects. There will be no more than 10 interviews.

Deliverable: Projections to assist the MVEIRB in assessing cumulative effects in the Drybones Bay/Wool Bay Area.

Interviews with Government Departments

The contractor will interview government departments with baseline biophysical information for the Drybones Bay/Wool Bay Area. The interviews will obtain ecological information on which to overlay valuable social, cultural and environmental attributes as well as current and projected developments for the purpose of cumulative effects assessment. There will be no more than 5 interviews.

Deliverable: Sketch maps for the MVEIRB to assess cumulative effects in the Drybones Bay/Wool Bay Area.

Design Impact Decision Tool and Draft Report

To the extent possible, all results of the study will be depicted in sketch maps to facilitate the use of the information gathered in decision making for EAs that are currently before the Board or may be come before the Board in the future. At a minimum, there will be a map depicting the sensitivity/vulnerability of areas or sites to impacts from development and a map depicting the uncertainties associated with the predictions of sensitivity or vulnerability. Possible other maps include the intensity of existing and expected development. The determination of uncertainty will be based on the gap analysis and on discrepancies, if any, between scientific and traditional knowledge.

The contractor will prepare a report, summarizing available information of the social, cultural and environmental importance of sites throughout the Drybones Bay/Wool Bay Area. The contractor will use this information to identify data gaps and inconsistencies between scientific knowledge and traditional knowledge that reflect uncertainties in impact predictions. The report will clearly outline the process used, information reviewed and assumptions made in the mapping of valued components most vulnerable to positive or adverse cumulative impacts. The report will also provide

a summary of key issues, identify potential cumulative effects, and propose project-specific mitigation as well as mitigation for all projects in combination. Appendices will include more detailed information regarding search terms, interview results, etc

Deliverable: Maps of impact sensitivity and of uncertainty and a companion report providing an overview of the state of knowledge for the area as well as the technical basis and assumptions for the Impact Decision Tools.

Refine Impact Decision Tools and Report

In cooperation with MVEIRB staff the contractor will refine and edit the draft maps and report and will submit a final version in hardcopy and digital. At least one digital copy must be in a format that can be edited by the MVEIRB.

Deliverable: Final versions of maps and report.

Presentation at the Public Hearing

Prior to the Public Hearing, the Cumulative Effects Study will be released to the Parties for comments as part of the project-specific EAs. The Parties may ask questions about and comment on the study. After this discussion, the Parties are welcome to use data and information from the Cumulative Effects Study to the extent they feel appropriate as part of their evidence.

The contractor will present the decision-making instrument to the MVEIRB for consideration of developments referred for potential adverse cumulative impacts. This presentation will occur at the Public Hearing for consideration relative to the evidence submitted by all parties.

Deliverable: Enhanced understanding of the decision-making aid among the Board Members of the MVEIRB.

Schedule

Table 2 provides an estimated timeline for completing this project. The Review Board may amend the schedule at its discretion.

Table 2 - Milestone Completion Timetable

Milestone	Date
Contract initiation meeting	July 3, 2003
Literature review and gap analysis	July 3-25, 2003
Site visit	July 19-20, 2003
Interviews with government departments	July 14-25, 2003
Interviews with industry associations and developers	July 21-25, 2003
Gather available traditional land use information	July 3-31, 2003
Design impact decision tool and draft report	August 7, 2003
Refine impact decision tool and report	August 7-14
Submit Cumulative Effects Study to MVEIRB	August 15, 2003
Presentation to the MVEIRB	At Public Hearing

Appendix B

North Slave Metis Alliance Land Use Information

- **Fishing**
- **Gathering**
- **Moose Harvesting**
- **Waterfowl Harvesting**
- **Camps**

Appendix C

Mineral Claims

Appendix D

Biophysical Resources Activities