Compendium of Research in the Northwest Territories 2000

Including: Scientific Licences, Archaeological Permits, Wildlife Permits and Fisheries Permits

AURORA RESEARCH INSTITUTE
AURORA COLLEGE

About the Aurora Research Institute

The Aurora Research Institute (ARI) was established in 1995 as a division of Aurora College when the Science Institute of the Northwest Territories (NWT) divided into eastern (Nunavut) and western (NWT) divisions.

The Aurora Research Institute's mandate is to improve the quality of life for NWT residents by applying scientific, technological and indigenous knowledge to solve northern problems and advance social and economic goals.

ARI is responsible for:

- licensing and coordinating research in accordance with the NWT *Scientist Act:* This covers all disciplines including the physical, social, biological sciences and traditional knowledge;
- promoting communication between researchers and the people of the communities in which they work;
- promoting public awareness of the importance of science, technology and indigenous knowledge;
- fostering a scientific community with the NWT which recognizes and uses the traditional knowledge of northern aboriginal people;
- making scientific and indigenous knowledge available to the people of NWT;
- supporting or conducting research and technological developments which contribute to the social, cultural and economic prosperity of the people of the NWT

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FOREWORD

The Compendium of Research is an important part of the Aurora Research Institute's efforts to keep northerners and other researchers informed of research activities in the Northwest Territories. By participating in the research licensing requirements for the north, researchers ensure that their research information is accessible to all those who need to be informed and others who may be interested in these activities. The sharing of this information allows for greater involvement of northerners in the development of research programs that are pertinent to the needs of the north. This information also enables researchers to work collaboratively on related issues.

The need for scientific and technological knowledge and development for northern environments is increasingly recognized by the people, the governing agencies and the private sector of the Northwest Territories. Training in these areas is critical to allow for adaptation to the rapidly changing social and economic structure of the North. ARI actively promotes partnerships with community groups, government agencies, and private sector organizations in order to identify research needs and strategies to meet these needs. Researchers are also partners in these endeavours.

Through the research licencing and permitting requirements, aboriginal organizations and community groups have input into the research that is conducted and are kept informed of current and proposed research in their region. ARI in cooperation with researchers assist in training community members to participate in research projects within and outside their communities.

Researchers make a valuable contribution to the north as they provide information and education through schools and community presentations, and they also provide employment and training opportunities. There are an increasing number of partnerships and cooperative programs being developed with researchers and the people of the north. By sharing this information the people of the north are able to help in shaping the future direction of research in their region.

The Aurora Research Institute works to connect the scientific community with the communities of the Northwest Territories by promoting and supporting studies which improve the understanding of the natural resources and indigenous knowledge and cultures of the NWT. The Compendium of Research is one means in which scientific and traditional knowledge is made available to people of the NWT.

Valoree Walker, PhD
Director
Aurora Research Institute

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About This Book

This Compendium is a summary of research licences/permits that were issued in the Northwest Territories during 2000. A separate Compendium, that includes licences/permits for Nunavut, can be acquired through the Nunavut Research Institute in Iqaluit or from their website at http://pooka.nunanet.com/~research/. The information contained in this book is a collaboration between the Aurora Research Institute (ARI), the Prince of Wales Northern Heritage Centre (PWNHC), the Department of Resources, Wildlife & Economic Development (RWED) and the Department of Fisheries & Oceans (DFO). The Compendium series began in 1986.

LICENSING IN THE NWT

Under territorial legislation, all research in the NWT requires a licence/permit from one of three agencies, depending on the type of research being conducted:

- Prince of Wales Northern Heritage Centre - Archaeology
- Department of Resources, Wildlife & Economic Development, Government of the Northwest Territories - Wildlife
- Aurora Research Institute - All other research in the NWT

Included in this Compendium are Fisheries Research projects conducted by the Department of Fisheries and Oceans staff. Other researchers conducting fisheries research are required to have a Science Licence and are included in this section of the Compendium. In addition to one of these licences/permits there may be other permits required depending on the nature of the research work.

Through the licensing process, researchers are informed of appropriate organizations, communities and other licensing/permitting agencies that should be contacted prior to conducting studies. Licensing ensures research activities are communicated to interested parties and provides opportunities for the exchange of information.

Although the Compendium is a summary of all licences/permits issued in the NWT by all three licensing/permitting bodies, it is not a list of actual research conducted. Verification and additional information should be requested from the researcher.

HOW TO USE THIS BOOK

This book has four main sections. Each of these sections reflect a specific licencing agency and type of licence/permit issued. Within each section research descriptions have been grouped by subject, and listed alphanumerically by the principal researcher's last name. Refer to the Table of Contents for the specific page each section and/or subject area begins on.

1. Reference Number

The reference numbers shown in each of the Aurora Research Institute's subject areas refer to the file number issued to a particular researcher. It allows cross referencing with research material that may be available on file or in the ARI library. The reference numbers of the other two agencies refers directly to the permit number given to each researcher. When requesting information from any of these agencies on specific research outlined in this compendium please refer to the reference number in your correspondence.

2. Regional Abbreviations

Throughout the book reference is given to the specific land claim region(s) that the research took place in. The regions are shown in Figure 1. Some of the land claim regions are still under negotiation and boundaries shown are only approximations. The abbreviations shown for each region are as follows:

DC	Deh Cho	**SS**	South Slave
NS	North Slave	**SA**	Sahtu
IN	Inuvik (includes Gwich'in and Inuvialuit Settlement regions)		

3. Index

At the back of this book, you will find a index. This has been developed to help the reader cross reference material more easily. The numbers listed in the index refer to the number listed with each research description, not page number.

4. Glossary

A glossary of terms has been added to the compendium. The intent of the glossary is to allow the reader to better appreciate the research descriptions.

AVAILABLE IN PRINT OR ON CD

The Compendium is available as a printed publication or digitally on CD. The Compendium can be downloaded on the Aurora Research Institute's Web site (www.nwtresearch.com) or a copy can be requested by contacting the Aurora Research Institute. The CD version is in WordPerfect format and has limited search capabilities. Contact the ARI for further information regarding search capabilities and services. We encourage photocopying of the printed publication to promote its distribution.

FOR MORE INFORMATION ABOUT THE RESEARCH LISTED IN THIS BOOK

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SEND US YOUR COMMENTS

Whether you are a researcher or an interested member of the public, the Aurora Research Institute welcomes your comments and suggestions about the Compendium. Contact us by mail, fax, e-mail or telephone (See address above).

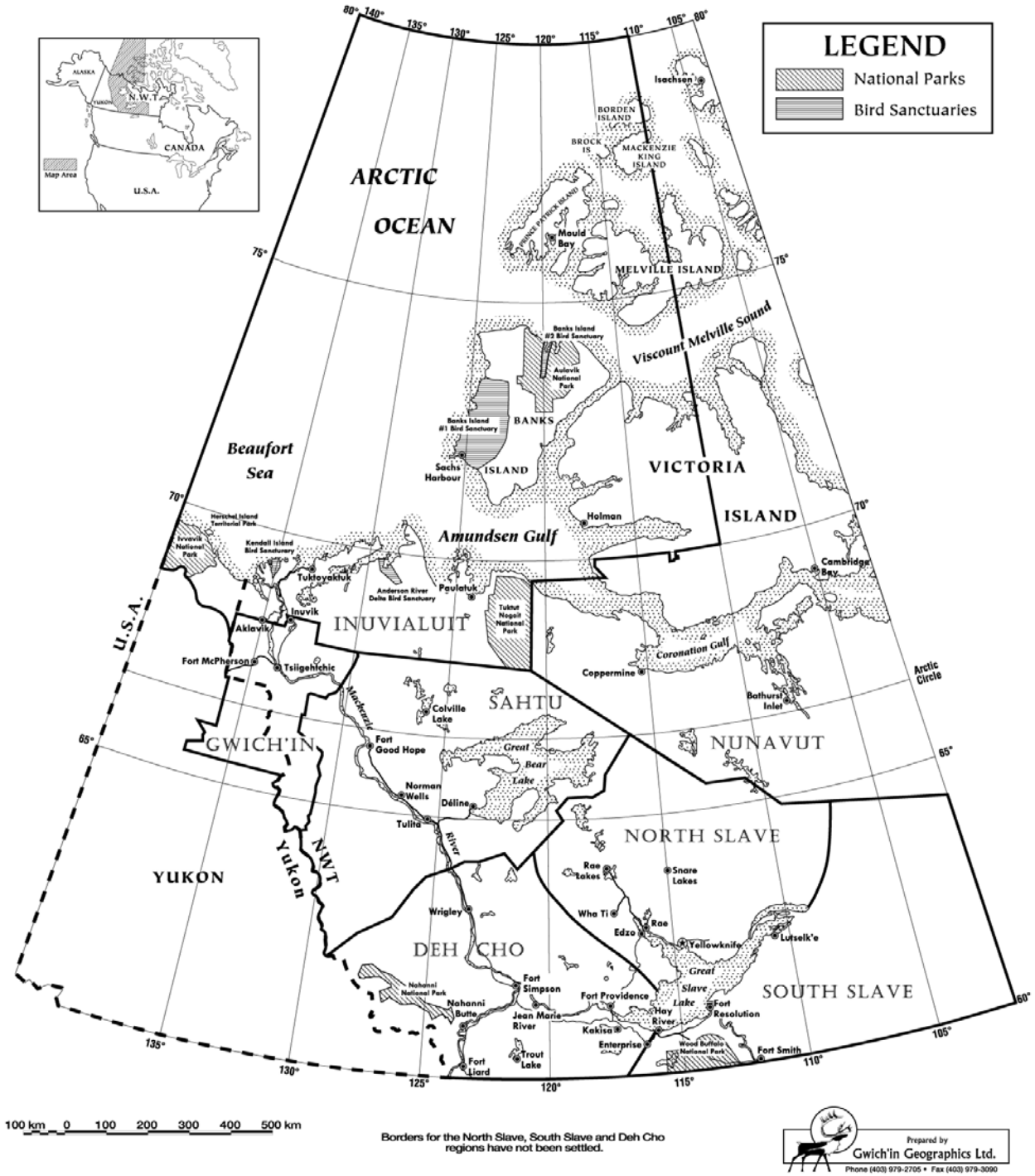

Figure1: Land Claim Regions in the Northwest Territories

Aurora Research Institute
Science Licences

Biology

001 Biology

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Reference Number: 12 402 597
Region: DC **Location:** 50 km north of Fort Providence

International Crown Fire Modeling Experiment (ICFME), Ft. Providence, NWT
The fourth phase (ICFME-IV), which involved the burning of 7 plots, was successfully carried out between June 10 and July 1, 2000 . There were excellent burning conditions for experimental crown fires at the start and end of ICFME-IV. The first test fires on June 12 and 13 confirmed that moisture conditions had reached a threshold suitable for conducting experimental crown fires. The treated/untreated plot was ignited on its east face permitting a comparison of the relative effectiveness of fuel treatments (i.e., pruning, light thinning and large dead-down woody material removal) on crown fire potential. There was very little difference in the resulting fire behavior which consisted of continuous crowning flame fronts with nearly identical spread rates. Plot S-,1 which was set up to test the limits of protective fire shelters in small clearings, was ignited resulting in a very high-intensity crown fire (coupled with a massive convection/smoke column) that provided a very hostile thermal environment for the testing of the shelters. Plot 1, one of the primary plots set up for testing the Albini physical crown fire behavior model, was successfully burnt as a well-developed crown fire front spread more or less "perfectly" across the plot area. Rain delayed any burning until June 25 when three experiments (roof ignition, vinyl vs. wood siding flammability and fire spread to the adjacent forest under moderate-high fire danger conditions [FWI 17]) were completed as part of the simulated house burning on Plot I-1. The rest of Plot B was ignited, showing the effectiveness of a recent burn in stopping an advancing crown fire. The burning of Plot "D-I" established (for the U.S. Geological Survey) in the northwest corner of the I-1 House Plot took place on June 26. The final plot (Plot 3) established for testing the Albini crown fire model was successfully carried out. A request was received from RWED Forest Management Division on June 29 not to burn, which was honored. However, 0.75 mm of rain fell the following day and with rising humidity and slack winds, the opportunity to burn Plot I2 during the 2000 field season was lost. The fifth and final phase of ICFME is tentatively scheduled for June 1-29, 2001. For further information see the ICFME web site at http://www.nofc.cfs.nrcan.gc.ca/fire/fmn/nwt/ .

002 Biology

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Reference Number: 12 402 611
Region: IN **Location:** Throughout the Gwich'in Settlement Area

Sustainable Alternatives to Industrial Forestry in the Gwich'in Settlement Area (GSA)

This was the last year of a three year project designed to involve students and community people in the discussion of how to use forest resources in the Gwich'in Settlement Region in a sustainable manner. The students travelled to Gwich'in communities to verify the work that they had done in previous years and to leave copies of the completed research with community organisations. A CD Rom data disk of scanned archival sources on historic forest use was prepared and deposited with the Gwich'in Social and Cultural Institute (GSCI) and the Gwich'in Renewable Resource Board (GRRB). Some of the archival descriptions on historic use of forests by steamship captains was verified by local elders. Several elders at the mouth of the Peel River and at Eight Miles were interviewed to complete our research into former sawmill sites and the patterns of driftwood use. Derek Honeyman worked on the ethno-history of former sawmill sites. Rob Wishart worked with elders to understand general patterns of Gwich'in forest use in the Delta area. Ara Murray continued her work on medicine and berry-picking areas. On the technical side of the project, Dr. Landhausser continued his research on the growth rates of white spruce demonstrating a more appropriate methodology for dating trees by examining their buried stems. Jessica Schloplick also continued her work studying how white spruce grows after fires or logging. She hypothesized in her report that there is a risk that trees which have been cut down would not be replaced by new growth. This hypothesis contradicted the statements of all Gwich'in elders, and should be tested more widely. There are full one page summaries of each component of the project on file at the Aurora Research Institute and at the Renewable Resource Committees in each Gwich'in Community.

003 Biology

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Environment Adaptation in Arctic Aquatic Organisms

Our research in the Northwest Territories (NWT) consisted of the collection of tissue and blood samples from northern pike (*Esox lucius*) and arctic grayling (*Thymallus arcticus*) for physiological studies. Part of our research investigates how environmental factors like temperature affect the metabolism of fish. The measurement of certain tissue and blood components like amino acids and lipids (fats) can tell us a lot about their metabolism. Amino acids and lipids are important energy sources for fish and can come from their diet or when food is scarce, from fat or muscle within their bodies. Northern pike have an extremely widespread distribution in North America ranging from Arctic lakes down to the regions of the southern United States. By comparing certain physiological parameters we can assess how environmental factors like temperature and photoperiod effect fish metabolism. The samples taken from pike populations in the NWT show that pike have similar blood amino acid contents to some other northern fish. We are in the process of comparing these results to populations of Northern pike from southern habitats and to other fish species from temperate and tropical regions. Distantly related to trout and salmon, the physiology of the arctic grayling is completely unstudied. Our research on the metabolism of this species will help us further understand their biology.

004 Biology

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Region: IN **Location:** Throughout the Gwich'in Settlement Area (GSA)

Developing Sustainable Non-timber Forest Product Business Opportunities in the Gwich'in Settlement Area

This study on Non-timber Forest Products (NTFP) in the Gwich'in Settlement Area had two objectives: (1) to identify the various berry plants which grow in the area to determine a percent cover for each of the species in various forest stands, and to estimate actual berry production in 2000; and (2) to interview members from each of the four communities (Inuvik, Fort McPherson, Tsiigehtchic, and Aklavik) to determine interest in selling of berry products which people collect. In June 2000, 24 transects were placed between Inuvik and Fort McPherson. The transects were placed in forested areas, which included white spruce stands, black spruce stands, paper birch stands, and peat/bog areas. After full leaf expansion, the percent cover of each berry species was estimated on nested plots of 1 m^2 at every 5 m along the transect. During the last week of July and the first part of August, sites were revisited to estimate berry production. Samples were collected to determine the dry weight of berries per hectare. Interviews were done in four communities in the Gwich'in Settlement Area (Inuvik, Aklavik, Tsiigehtchic and Fort McPherson). Six people, in each of the four communities, who were knowledgeable about berry products were interviewed. The type of questions asked included the products from the forest they collect, how much of each product they collect, uses of each product they collect, if they had ever sold or traded the products they collect, and attitudes and feelings on the potential to sell the products they collected.

005 Biology

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Region: SS **Location:** Kennedy Lake Exploration Camp

Gahcho Kue (Kennedy Lake) Baseline Environmental Studies - Fisheries Program 2000
A Fisheries Program done during the spring and summer of 2000 was divided into two sections. The first part was a fish trapping study in addition to stream habitat surveys that were done at Gahcho Kué during the spring of 2000. Arctic grayling were the main species during the spring tagging program as this species undergoes it's annual migration at this time from lake habitats to spawning habitats in tributary streams. Fish traps were installed and monitored at nine suitable locations in Gahcho Kué and Control Lake tributaries. Pertinent data recorded for each trap included: data and time of installation, location/orientation depth and habitat conditions at the site. All traps were routinely monitored to check for fish. A total of 278 fish were captured in fish traps at Gahcho Kué and Control Lake drainages. The second part of the Gahcho Kué Baseline Environmental Studies was completed during the summer of 2000. Crews set trap nets and angled during the seven-day field survey in attempt to recapture fish that had been captured and tagged during the 2000 spring field program. The crews targeted arctic grayling, but also collected other species such as lake trout, burbot and northern pike in the near shore areas of Gahcho Kué. All captured fish were identified as to species. Lengths and other information, such as gender and condition, were collected for selected specimens. Fish recaptured from the spring tagging program were examined to record the tag number, and inspected for signs of handling stress and then released.

006 Biology

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Region: IN **Location:** Horton River (Horton Lake to Dew Line station Franklin Bay)

Insect Biodiversity and Biogeography along the Horton River, NWT
The objective of this research was to conduct a comprehensive collecting program to provide baseline information about aquatic diversity in northern rivers, with particular reference to black flies and other aquatic insects. The 6 member team traveled by canoe from Horton Lake to the Beaufort Sea from July 17 to August 9, 2000. Numerous collections of insects were made along the 620 km course of the Horton River. In terms of black flies, at total of 30 species were collected (more species than were previously known from all of the Northwest Territories and Nunavut combined). This underscores how poorly known the insect fauna is at northern latitudes. One of these species, which was previously unknown to science, is now in the process of being formally described. Other flies chosen for detailed study included phorid flies (Phoridae) and midges (Chironomidae). Identifications of these groups are still underway. Other insects that were studied in detail are the aquatic insects mayflies, stoneflies, and caddisflies. Two publications have already resulted from this research.

007 Biology

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Region: IN **Location:** Prince Patrick and Melville Islands

Canadian Arctic Plants: Systematics and Evolution

Our research on the systematics, identification and evolution of arctic flowering plants is currently focused on arctic grasses. The bluegrasses (*Poa*) and the alkali grasses (*Puccinellia*) are two particularly difficult groups to identify and understand in the Canadian Arctic. During the 2000 field season, fieldwork was carried out at McCormick Bay, Melville Island and in the vicinity of Mould Bay, Prince Patrick Island. Plants were collected, leaf material preserved for DNA analysis, and notes on their ecology and reproductive biology prepared. Voucher herbarium specimens have been deposited in the Herbarium at the Canadian Museum of Nature. The researchers made several very useful collections of alkali-grasses from their type localities (the location where the plants were originally described), and are studying our collections using genetic and morphometric analyses to determine how many species of alkali-grasses and bluegrasses there are in the Canadian Arctic and how best to define these species. Collections and photographs taken in the field will be used to produce identification guides to Canadian Arctic Island plants. In 2001 the research team published two manuscripts: (1) a study of genetic variation and evolution of Canadian arctic bluegrasses; and (2) a study of arctic alkali grasses focusing on the morphological features used to separate the different species.

008 Biology

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Region: NS **Location:** Snare Hydro Camp at Snare Rapids

Snare River Aquatic Study

The Snare River Minimum Flow Assessment study addressed the removal of minimum flow requirements at the Snare Falls hydroelectric dams. It included an assessment of fish and fish habitats as well as potentially altered velocities, aeration, sedimentation and water levels in river spawning habitats due to water level fluctuations. Results were compared with previous records as a reference. The biological characterization of the Snare River system study was done to identify the present status of the Snare River system, with respect to the aquatic environment, from Bigspruce Reservoir to Strutt Lake. Parameters analyzed included water quality (including dissolved oxygen and chlorophyll *a*) sediment quality, benthic macro invertebrates, fish communities and mercury content of fish. Results were compared with data from previous studies in the area to study the effects of hydroelectric development on the aquatic environment. Overall, the status of the Snare River System in 2000 was similar to conditions measured in previous years. Surface waters, sediment, and biological communities were similar to other pristine, oligotrophic Arctic water bodies.

009 Biology

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Reference Number: 12 402 624
Region: IN **Location:** Tuktoyaktuk - Husky Lakes

Integrated Coastal Zone Management Planning for the Husky Lakes in the Inuvialuit Settlement Region
The Husky Lakes Integrated Management Planning Study was designed to gather background information on land use and development in the Husky Lakes region. Residents of Tuktoyaktuk and Inuvik were interviewed to determine how they use the land and water and how they feel about development: oil and gas, all-weather road, tourism, and reindeer herd revitalization. The study was discussed with the Inuvialuit Land Administration (ILA) and Fisheries and Oceans Canada (DFO), and the general terms of reference of the study were set. A trip was made to Husky Lakes. At the end of June, as second trip was made to interview Tuktoyaktuk and Inuvik residents regarding their use of Husky Lakes. Most of July and August were spent in Tuktoyaktuk, but one week was spent in Inuvik, where 5 people were interviewed. While in Tuktoyaktuk, meetings were held with the Hunters and Trappers Committee (HTC) and ILA to discuss the study. Upon returning to Winnipeg in late August, it was decided that a few more interviews should be carried out. Another trip was made to Tuktoyaktuk in October and 20 more people were interviewed, bringing the number of residents interviewed to 46. This completed the fieldwork portion of the study for 2000.

010 Biology

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Region: IN **Location:** Inuvik

Emission of Biogenic Volatile Organic Compounds from Western-Canadian Tundra During the Autumn Freeze-up Period.
During August and September of 1968, Cavanaugh *et al.* collected a series of air samples from Northern Alaska. Several species of volatile organic compounds were then quantified by gas chromatography. Very high levels of n-butanol were found in all three sampling locations. The Cavanaugh group was skeptical of their results, and thus did a series of analytical checks in order to confirm their results. In an attempt to duplicate the findings of Cavanaugh *et al.* in Northern Alaska, air samples were collected from the tundra regions north of Inuvik at the beginning of freeze-up and analyzed for n-butanol and a suite of other naturally occurring volatile organic compounds. Air samples were collected into 6 liter stainless steel canisters using a small (<10kg) battery powered air sampler. Air was sampled from the chamber periodically to establish biogenic emission rates of n-butanol and other volatile organic compounds. Finally, several 1kg soil samples were collected from the area around the air sampling site for future analysis.

011 Biology

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Reference Number: 12 402 645
Region: DC SA **Location:** Mackenzie River from Fort Simpson to Norman Wells

Ecophysiological Reconstruction of High Latitude Fossils

The adaptive physiology and productivity of forests that once lived at high latitudes during the Cretaceous era gives the basis for finding out the potential biological productivity of the planet during warm periods and provides clues to plant physiological adaptations which would be successful at high latitudes during warmer global cycles, past or present. Initial analysis of wood anatomy features of fossil *Metasequoia* (45my) from Axel Heiberg Island (paleo-latitude = 77 degrees N) as well as modern *Metasequoia glyptostroboides* and *Gylptostrobus pensilis* have showed that the wood of these two species can be separated. This gives a way to find out how much of each was in the paleo swamp forest. We have also definitely identified the wood of *Larix* from the fossil Eocene sites, and this is the only positive identification of Larix wood from the fossil record, and is among the oldest record among assumed identifications. Analysis of ray volume of extant *Larix laricina* wood collected from its full latitudinal range (West Virginia to Labrador and Illinois to Northern NWT) has not revealed a latitudinal signal as we had thought. This removes the possibility of using this character as a possible indirect indicator of temperature in the fossil forest. Analysis of tracheid length, fibril angle and wood strength (MOR, MOE) of *Metasequoia glyptostroboides* has shown a set of relationships unusual for conifers. This is being investigated further. Preliminary physiological experiments for *Metasequoia glyptostroboides* have shown that the relict species has characteristics (photosynthetic response curve, water use efficiency, leaf morphology/anatomy) which are consistent with adaptation to a warm, continuous (but low-intensity) light environment, as has been proposed for the high latitude paleo-environment of the Eocene epoch.

012 Biology

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Region: IN **Location:** Tuktoyaktuk Lake

Tuktoyaktuk Lake and Fish Habitat Survey

In 1999, Anderson Exploration Limited (AXL) proposed a 3D and 2D seismic exploration program on and near the Tuktoyaktuk Peninsula for the 2000/2001 winter season. Inuvialuit Environmental & Geotechnical Inc. commissioned Applied Aquatic Research Ltd. to find out the extent to which fish populations in the project area would be at risk as a consequence of the possible use of conventional drilling techniques to create shot holes in the lakebeds. The survey involved three main components: a review of existing data of the water bodies of the Tuktoyaktuk Peninsula; a traditional ecological knowledge (TEK) survey; and a biophysical survey of lakes in the study area. In total, 276 lakes in the vicinity of Tuktoyaktuk were surveyed from August 21 through September 6, to classify the lakes in the project area based on their capability to winter fish. The study area encompassed about 260 km^2 of land. Three field crews of four persons did the work using helicopter support for the field component. Background information on the lakes, streams, and near shore areas within the project area was compiled through a comprehensive literature review of existing data, a review of topographic maps and aerial photographs, a helicopter survey of the study area, and community meetings with Inuvialuit from the area. This information was used to compile life history descriptions of key fish species expected to occur in the project area. A study of traditional ecological knowledge (TEK) to look at the kinds and numbers of fish within the study area was done via interviews with the Hunters and Trappers Association of Tuktoyaktuk. This identified several lakes in the study area known to winter fish. Field crews did not further assess these lakes. A field program was done to survey basic biophysical characteristics of lakes within the study area. A bathymetric profile of each lake was completed. Depth information was also used to rate lakes with respect to their potential to maintain water under ice in the winter, and to provide fish overwintering habitat. Any fish species observed or trapped/angled were recorded. Water quality measurements were taken for 40 of the 276 lakes, recording water temperature (ºC), conductivity (mS/sec), dissolved oxygen (mg/l), and pH. Lakes identified as being sufficiently deep to winter fish successfully (>3 m mean depth) were to receive additional protection measures during the seismic program. Fish were observed in 30 of the 276 lakes (11%), with northern pike, cisco, and nine-spine stickleback the only species observed. Five of the 276 lakes were identified as having high potential to winter fish. Of the remainder, 29 were identified as having a moderate potential to winter fish. The rest would be expected to freeze to the bottom in winter. The measurement of water quality parameters resulted in means of 6.8°C for temperature, 194.9 mS/sec for conductivity, 13.4 mg/l for dissolved oxygen, and 8.2 for pH. A map of the surveyed lakes was produced, indicating TEK lakes and lakes that have high and medium probabilities of wintering fish. Recommendation of appropriate mitigation and monitoring procedures were made based on the findings of the study to avoid harmful changes, disruption or destruction of fish habitat, and take into account seismic exploration guidelines developed by Fisheries and Oceans Canada (DFO).

013 Biology

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Region: NS **Location:** BHP Ekati Mine Base Camp

The Effectiveness of a Diversion Channel in Providing Fish Habitat in NWT Barrenlands

In 1991, diamonds were discovered in the remote Barrenlands region of the Northwest Territories, Canada. In preparation for mineral extraction, two lakes and their tributary streams were drained. As part of a habitat compensation agreement, the mining company (BHP) designed and constructed a diversion channel with fish habitat structures. It is anticipated that the channel will restore watershed connectivity, allowing fish migration, while habitat structures will provide spawning and nursery habitats, improving the productive capacity for fish. We are examining the effectiveness of the channel and habitat structures in providing productive fish habitat, with particular focus on arctic grayling. Preliminary data suggest that the diversion channel and natural streams contain similar fish densities, however, the natural streams support a much greater fish biomass. Reduced algae and sediment organic matter in the diversion channel suggest that it's lower productivity results in reduced growth of 0-age grayling. Benthic invertebrate densities and biomass are also lower in the diversion channel in comparison to natural streams surrounding the mine. Adult grayling are able to go up and down the diversion channel in two days. The adults are spawning in the diversion channel, however their relative success is unknown. Our work now is on laboratory and statistical analyses followed by writing of papers.

014 Biology

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Reference Number: 12 402 642
Region: NS **Location:** Fox Holes Lake

Molecular Analysis of Evolutionary Change in Stickleback Populations

We are interested in understanding how evolution happens at the level of genes and DNA. To identify the DNA changes that make one species look different from another, we are studying stickleback fish. There are three species of sticklebacks that we are studying: threespine sticklebacks, ninespine sticklebacks and brook sticklebacks. All three species have bony spines on their backs and bellies, and bony plates along their sides for protection against predatory fish and birds. However, we found ninespine sticklebacks and brook sticklebacks in Fox Holes Lake that did not have spines on their bellies. In 2001, we plan to return to Fox Hole Lakes to collect both of these species of sticklebacks and cross them to sticklebacks that have belly spines. This will allow us to identify the genes causing the loss of the spines in two different species of sticklebacks, and tell us if the same gene or different genes are responsible for this evolutionary change.

015 Biology

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Reference Number: 12 402 625
Region: DC **Location:** Nahanni National Park Reserve, Hole In The Wall Lake

Measuring Genetic Diversity in Small False Asphodel, *Tofieldia pusilla* (Liliaceae), in Glacial Refugia, Disjunct Populations on Lake Superior and Across its Broad Arctic Range : A Tool for Prioritizing Sites for Conservation

This study focussed on measuring genetic diversity in small false asphodel, (*Tofieldia pusilla*), in glacial refugia. This research will contribute to an increased understanding of ecological integrity in Nahanni National Park, provide information on the importance of glacial refugia as banks of genetic diversity and highlight the value of genetic diversity as an indicator of ecological integrity. At each site, samples were taken from 3 populations of the plant species small false asphodel.

016 Biology

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Region: NS **Location:** East Island of Lac de Gras

Annual Environmental Effects Monitoring

Diavik Diamond Mines Inc. (DDMI) environmental policies are geared towards continuous improvement, by using sound adaptive management practices. DDMI is committed to measuring its performance through ongoing monitoring of key performance indicators. DDMI completed water quality, aquatic effects, fisheries, wildlife/vegetation and meteorological monitoring programs. Water quality monitoring consisted of aquatic effects monitoring (AEM) and surveillance network program monitoring (SNP). The 2000 AEM focussed on the establishment or enhancement of baseline information regarding the conditions of Lac de Gras specific to the monitoring requirements for future aquatic effects monitoring programs. SNP monitoring consisted of collecting numerous water samples for compliance purposes at set locations specified under DDMI's Class A Water License requirements. Under the fisheries authorization, DDMI undertook two specific aquatic studies: fish habitat utilization study and a slimy sculpin baseline study. The habitat utilization study focussed on habitat used by lake trout around the mining development within Lac de Gras using radio transmitters to track fish movement throughout the year. The slimy sculpin study targeted the collection of small fish, to obtain predevelopment (baseline) tissue and organ metal content. Wildlife and vegetation monitoring was done through the year. A construction impact wildlife monitoring program was begun to evaluate wildlife and the projects interactions during the first year of construction. These findings will be used to confirm baseline findings and to detect changes in distribution of wildlife species. Vegetation studies focussed on determining the amount of lost vegetation types to mining development. Local meteorological monitoring measured wind speed, wind-direction, precipitation, ambient air temperature, incoming solar radiation, and relative humidity.

017 Biology

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Reference Number: 12 402 641
Region: DC **Location:** Cameron Hills

Environmental Assessment for Petroleum Exploration, Drilling and Development, Cameron Hills, NWT.
Western Oilfield Environmental Services Ltd. and Golder Associates Ltd. completed biophysical and archaeological studies on proposed development lands in the Cameron Hills area on behalf of Paramount Resources Limited. The research was done between June and September. The work included soil, vegetation, wildlife, fisheries and heritage studies. The soils of vegetative communities were studied to find out depth of frost and soil classification. The results showed 5 different soil classifications were present. Vegetation was studied by determining characteristic species and vegetation communities. The six communities identified were mixedwood forest, trembling aspen-dominant woodlands, coniferous woodlands, riparian areas, black spruce bog, and graminoid and shrubby fens and shallow open water. No rare plants were identified. Wildlife was studied from the air and on the ground. Habitat quality, sightings and signs were looked at and photographs were taken. A total of 74 bird species were recorded for the project region of which 69 were recorded within 1 km of the project components. No raptor nests were observed in the project area. Mammal species and or signs observed during the survey consisted of red squirrel, black bear, moose, beaver, snowshoe hare, wolf, caribou, coyote and deer. Fish data was obtained at three of the proposed water crossing locations; the remaining crossings had low to no potential to support fish. Habitat was assessed, photographs were taken, mapping of habitat features was completed, water quality was measured and electro-fishing was completed. Fish resources in the area are limited. Heritage resources were examined during a heritage resource impact studies to find out potential damages to cultural resources. No heritage sites were found.

018 Biology

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Reference Number: 12 402 601
Region: SA **Location:** Tsiigehtchic area

Environmental Assessment for Proposed Oil and Gas Development Activities in the Gwich'in Region, NWT.
Golder Associates Ltd did an environmental assessment of Devlan Exploration Ltd's proposed oil and gas development activities in the Gwich'in region of the NWT. Proposed seismic lines, well sites and access roads will be located south-west of the community of Tsiigehtchic. To find out the potential impact of this project on fish and wildlife in the area, vegetation and habitat along the proposed project area was mapped during an aerial survey in early October. Wildlife signs along the proposed routes were documented, as well as the distance to sensitive areas such as eskers and stream crossings. Project elements were routed away from sensitive areas. In particular, the proposed road access was routed away from an active bear den and a steep crossing of the Tree River. Consultation with the Gwich'in Renewable Resource Board and the Gwich'in Renewable Resource Council are on-going.

019 Biology

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Reference Number: 12 402 644
Region: SA , DC **Location:** Keele River, Fort Liard area, Nahanni River area, Mountain River area

Identification and Assessment of Critical Bull Trout Habitat in the Northwest Territories

Bull trout (*Salvelinus confluentus*), a member of the char family, were discovered in three new locations in the Sahtu and Deh Cho regions of the Northwest Territories in the summer and fall of 2000. Twelve bull trout were caught in an unnamed creek flowing east into the Kotaneelee River. Thirteen bull trout were captured in the Keele River (64°14.99'N, 125°59.74'W) and two at the Wrigley outflow (64°49.98'N, 126°11.15'W). Two fish were kept from each location and measurements such as weight, length, sex, maturity and age were taken. All of the bull trout released were fitted with a small colored tag (Floy tag) attached below the dorsal fin. These tags will allow biologists to monitor movement and growth over time for these individuals. Preliminary results indicate that bull trout use tributaries associated with the Keele and Kotaneelee Rivers for spawning and rearing. The fish at Wrigley Lake outflow appear to be from a lake-dwelling (afluvial) population whereas fish found in the Keele and Kotaneelee River systems are likely part of river-dwelling (fluvial) populations. Capture of bull trout from these three locations and reports of captures from other locations within the NWT suggest that bull trout may be the dominant char in the area. Little is known about these char populations, therefore further studies are necessary to find out the biology, distribution and habitat requirements for bull trout in the NWT.

020 Biology

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Reference Number: 12 402 631
Region: NS **Location:** Stagg River

Fish Habitat Compensation Monitoring Program - Highway #3, Stagg River

On behalf of the Department of Transportation (GNWT), Dillon Consulting Limited was contracted to complete the first year of a three year monitoring program designed to assess created/enhanced Northern pike spawning habitat. Enhanced habitat was constructed in 1999, as part of a fisheries compensation agreement between the Department of Transportation and the Department of Fisheries and Oceans, Canada. Preliminary results concluded that the enhanced habitat is functioning as designed. Although spawning and/or pike fry were not observed at the Stagg River site in 2000, Northern pike were observed utilizing the constructed habitat for rearing and foraging purposes throughout the summer months. It is anticipated that over time, as the constructed habitat is allowed to stabilize naturally and aquatic plants begin to emerge, northern pike will use this area during spring spawning activities.

021 Biology

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Reference Number: 12 402 638
Region: SA **Location:** Great Bear Lake (Edacho peninsula)

Preliminary Reconnaissance of Wildlife and Vegetation of the Proposed Sahyoue/Edacho National Historic Park, Edacho Portion, Great Bear Lake, NT.

Between July 4 and 10, a field trip was carried out to survey the flora and fauna of Edacho. The following summary highlights the results of the 2000 resource baseline study program. Fifteen community types were recognized in the field: white spruce closed and open canopy, white spruce open canopy on lichen and sphagnum, mixed forest, deciduous young, deciduous closed canopy, tall shrub land open and closed canopy, low shrub land open and closed canopy, low shrub land regeneration, lichen, non- or sparsely vegetated, wetlands and water. A total of 152 vascular plant species were documented as occurring on Edacho, representing 33 families. The six dominant plant families accounting for almost 60% of the species total were sedge (*Cyperacea*e), willow (*Salicaceae*), grass (*Gramineae*), pea (*Leguminosea*), heath (*Ericaceae*) and sunflower (*Compositae*). A total of 61 different wildlife species were documented as occurring on Edacho: 5 species of fish, 42 species of birds, and 14 species of mammals. A total of 189 wildlife observations were recorded, most of which consisted of wildlife sign such as tracks, scat and browse. Of these 189 observations, 31 were of fish, 107 were of birds or bird sign, and 51 were of mammals or mammal sign. Based on our results, we feel that there are at least four areas that are significant to wildlife on Edacho: Edacho Point, MacKintosh Point, Deerpass Bay, and the valley between the two plateaus. Edacho Point and MacKintosh Point are landscapes features with species of birds and plants that prefer a tundra habitat. Deerpass Bay supports large numbers of waterfowl, including Pacific Loons, and fish. The valley between the two plateaus is thought to have high plant species diversity because of the juxtaposition of many ecotones and the favorable influence of a microclimate.

022 Biology

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Reference Number: 12 402 624
Region: IN **Location:** Tuktut Nogait National Park (TNNP)

Measuring Tundra Productivity and Vegetation Structure Using Satellite Imagery

Accurate estimates of terrestrial net primary productivity (NPP) are critical to climate change monitoring, wildlife management, and sustainable resource management in Canada's northern National Parks. Currently Parks Canada receives GEOCOMP-n AVHRR cloud-free satellite composite images for all of Canada every 10-days and is currently developing methods to utilize this imagery for ecosystem monitoring in Canada's National Parks. The primary objectives of this research were to 1) develop methodology for estimating arctic NPP using the 1 x 1 km resolution AVHRR satellite imagery produced by the GEOCOMP-n image processing system, 2) assess the influence of variable topography and sub-pixel water bodies on VHRR reflectance measurements and 3) evaluate the correspondence between the GEOCOMP-n AVHRR image products and ground data. The NPP model is parameterized using a combination of ground data collected during the summer of 2000, as well as data available from previous research. The model results are evaluated with an expected productivity map produced using a vegetation classification and expected annual NPP values compiled from the literature. Proportion of water and vegetation cover and topographic complexity within each pixel are measured and the influence of these variables on the difference between modeled and expected values are evaluated. Model estimates of NPP provide an excellent relative measure of NPP in Tuktut Nogait National Park and is easily implemented using the GEOCOMP-n data exclusively. The AVHRR NPP maps will be useful for ecosystem monitoring, providing the ability to identify time and space trends and changes in NPP at a regional scale. These data will be particularly useful for identifying areas of interest that need further examination, either with high resolution imagery, or ground surveys.

023 Biology

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Region: SS **Location:** Wood Buffalo National Park

Analysis of Natural Thinning Processes in Mixed Species Forests.

We studied how the mixture of two tree species grows under natural conditions in Wood Buffalo National Park. In particular, we examined structure of dense forests of jack pine and quaking aspen that are developing after hot fires. The study included three aspects. First, type of forest site was characterized by examining plants growing on the forest floor by developing an extensive plant list. For example, certain plants are known to grow on wet sites; some are on dry sites. Second, description of site characteristics was strengthened by a series of soil surveys. Vertical soil profile was described in each study site. Then soil samples were taken, and later analyzed for the amounts of carbon and nitrogen in the laboratory. Third, relationships of tree density (number of stems per hectare), aboveground biomass (grams of plant material above the ground), and degree of mixture of the two tree species were analyzed. We found that most of the mixed forests showed similar biomass of about 120 t/ha regardless of the species' proportion. We also found that the proportion in biomass of quaking aspen in the mixed forest is minimal until aspen percentage by the number of trees exceeds 80%.

024 Biology

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Reference Number: 12 402 643
Region: NS **Location:** Daring Lake Tundra Ecosystem Research Station

The Use of Sediment Data as an Indicator of Aquatic Ecosystem Health in the Coppermine River Basin, NWT

This study evaluates the quality of lake bottom sediment as an environmental indicator and outlines its contribution to environmental management in the Coppermine River basin. The research has two related components: 1) analyzing sediment cores from the headwaters region of the basin and 2) interviewing interested parties involved in environmental management in the basin. Sediment cores were collected from four lakes: Lac de Gras, Desteffany Lake, Point Lake and Daring Lake. Analyses of metal concentrations reveal two issues. First, elevated metal concentrations are present in lake bottom sediment. For example, arsenic, iron and manganese concentrations exceed sediment quality guidelines for the protection of aquatic life at Lac de Gras. These elevated metal concentrations may cause adverse effects in aquatic biota and pose a risk to water quality. Second, metal enrichment from anthropogenic activities is occurring at some lakes. For example, mercury concentrations are enriched in sediment at Lac de Gras, Desteffany Lake and Daring Lake; and lead concentrations are enriched in sediment at Lac de Gras and Daring Lake. These enrichments are likely due to the long-range transport of metals from more industrial regions. Interviews were done with thirty interested parties, including representatives of government, industry, environmental organizations, and Aboriginal and community groups. Participants are concerned about environmental stresses and impacts in the basin, including diamond mines, climate change, long-range transport of atmospheric pollutants (LRTAP), human settlements, cumulative effects, water quality degradation and nutrient enrichment. The interview responses suggest that the immediate purpose of environmental indicators should be to assess the current condition of the ecosystem, and the long-term purpose should be to document trends over time and provide early warning of degradation. The research concludes that lake bottom sediment represents a good environmental indicator for the basin. The indicator's strengths are that it is able to document trends over time and is effective in indicating LRTAP. In addition, the indicator makes a significant contribution to environmental management. First, the indicator can be used to report information, particularly information about trends over time. Second, the indicator can be used to facilitate communication between decision-makers and the public, provided the information is presented in an understandable language and format. Third, the indicator can be used to develop and evaluate policies, including policies related to the anthropogenic release of metals.

025 Biology

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Region: NS **Location:** Yellowknife - Great Slave Lake area

Distribution of Dark-Celled Fungal Root Endophytes Along an Arctic to Boreal Latitudinal Gradient

Dark-celled fungi often live in roots of vascular plants in cold-weather environments, although their ecological and physiological role within plant roots is unclear. These fungi are called the dark septate root Endophytes (DSE), a complex made up of at least four strictly asexually reproducing species. One of these species, *Phialocephala fortinii*, displays very little host specificity and, when inoculated on some plants a variety of effects can be observed. This difference in response has been attributed in part to genetic heterogeneity of the isolates, but very little is really known about how genetic variation of this fungus relates to host or habitat variables. The objective of this project was to find out (a) whether differences within the DSE is correlated to an environmental parameter (latitude); and (b) how these differences are structured within and among populations of DSE. Willow roots were collected along a gradient spanning from southern Alberta through to Nunavut and dark-celled root-inhabiting fungi were isolated from these samples. Three species of DSE were isolated from across Alberta, but only one, *Phialocephala fortinii*, was also isolated from the Northwest Territories and Nunavut. Genetic variability of *Phialocephala fortinii* is currently being evaluated in the lab using a DNA fingerprinting technique (amplified fragment length polymorphism) in order to assess the amount of clonality within populations and to look at the relationship of environment to genetic variation in these common root-inhabiting fungi.

026 Biology

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Reference Number: 12 402 608
Region: NS **Location:** Snap Lake area

Snap Lake Project, Environmental Baseline Survey

Golder Associates was contracted by Winspear Resources Ltd. (now De Beers Canada Ltd.) to conduct wildlife surveys air and water quality monitoring at the Snap Lake property. Data collected will be used to establish baseline conditions, assess the potential impact of current operations, and to support a future Environmental Impact Assessment of the Snap Lake property. Hydrology studies at Snap Lake looked at water quality both up- and down-stream of the Snap Lake camp, including direct monitoring of effluent. Water drainage through the project area was monitored, as were dust and noise levels on sites. The wildlife monitoring program was similar to that done by Golder Associates in 1999, and much of the data will be comparable. Wildlife monitoring was done in a study area of 31 km radius around the camp, between April 10 and August 17. Caribou studies included the monitoring of caribou migration through the study area and across the winter road, through aerial- and ground-based surveys. Carnivore tracks were recorded in the spring, and eskers were searched for dens in the summer. Upland breeding bird densities were estimated during the breeding season. Cliffs were surveyed for raptor activity, and compared to raptor nest sites found in previous years. Waterfowl surveys were done along 18 lakes in the area. Consultation with RWED concerning the results is on-going. Visits of the Snap Lake property by local community members were held throughout the year. Community members were hired to assist in the summer environmental monitoring program, and their traditional ecological knowledge of the area was included to add to our information of the area.

027 Biology

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Region: IN **Location:** Amundsen Gulf

Amundsen Gulf Survey

At the request of the hamlet of Sachs Harbour, Northwest Territories and the Inuvialuit Fisheries Joint Management Committee a survey was done to look at possible benthic resources in the area near the community. This report summarizes the results from the field seasons of 1999 and 2000. The benthos was sampled using photographic methods, long lines and crab traps. Brittle stars were the most numerous. Toad crabs (*Hyas coarctatus aluetacius*), softshell clams (*Mya sp.*), and cockles (*Serripes groenlandicus* and *Clinocardium ciliatum*) were also found but in low numbers. Samples from the eastern portion of the Sachs River estuary were found to be anoxic below about 15m. The Final Report of the study is available online at www.dfo-mpo.gc.ca (follow the links to the Library database called WAVES:Siferd, T.D. 2001. Sachs Harbour marine benthic community survey. Summary of results 1999-2000. - Can. Data Rep. Fish. Aquat. Sci. 2366:vii + 47 p.)

028 Biology

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Reference Number: 12 402 627
Region: SS **Location:** Wood Buffalo National Park

Temporal Variability of Stable Carbon and Nitrogen within the Food Webs of Wood Buffalo National Park
No field work was completed in the 2000 field season in the NWT. Laboratory based experiments at the University of Alberta were completed, using previously collected samples.

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029 Biology

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Region: NS **Location:** Panda Diversion Channel, Ekati Diamond Mine

2000 Panda Diversion Channel Monitoring Program
Between May and August of 2000, Dillon Consulting Ltd monitored fish use of the Panda Diversion Channel (PDC) at BHP's Ekati™ Diamond Mine. The mine is located approximately 300 km NNE of Yellowknife, NT. A total of 411 arctic grayling (*Thymallus arcticus*) of taggable size were captured at the Kodiak box trap of the PDC in the spring of 2000. This marks a dramatic increase from the numbers caught in previous years. Other species of fish captured included lake trout and burbot. Sampling at the Panda fish box trap resulted in the capture of 79 arctic grayling of taggable size. Of the 79 grayling captured in this size range, 21 migrated downstream from North Panda Lake, and at least 15 swam upstream from Kodiak Lake into North Panda Lake. The only other fish species captured at the Panda fish box trap was lake trout. Arctic grayling larvae were sampled in the PDC from June 29 - July 3, by actively netting fish and obtaining total length measurements. A total of 2,479 arctic grayling larvae were collected by actively netting at nine sites within the PDC. All sampled larvae were released live at the site of capture. Low-flow electro-fishing at habitat assessment sites in July resulted in the capture and sampling of 2,753 arctic grayling young-of-the-year. Other species captured and sampled include burbot, slimy sculpin and round whitefish.

030 Biology

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Reference Number: 12 402 605
Region: NS **Location:** Colomac mine site (Steeves Lake, Baton Lake, Spanner Lake, Lake 314 and the Indian River)

Colomac Mine Abandonment and Restoration Plan - Fisheries Component
Dillon, in association with Norecol Dames & Moore developed the final abandonment and restoration plan for the Colomac Mine. Specifically, the project included the development of reclaimation options, field investigations/feasibility assessments, options analysis, and the preparation of recommendations for the site. Dillon biologists also completed detailed aquatic investigations to evaluate fish communities, contaminant levels in fish tissues (metals) and fish habitat assessments within the study area.

031 Biology

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Region: IN **Location:** Throughout the Gwich'in Settlement Area

Fisheries and Wildlife Research Projects in the Gwich'in Settlement Area
This year was the third year of the Peel River Fish Study. The project ran from mid-July to mid-November 2000. Fred Koe and William Teya from Fort McPherson worked as monitors for the project. Nets were set for 24 hours on Mondays, Wednesdays, and Fridays throughout the study period. Monitors caught 295 herring (arctic and least cisco), 235 broad whitefish, 25 coney (inconnu), 133 crookedback (lake whitefish), and 26 jackfish (northern pike). Samples from these fish are currently being analyzed to find the age of the fish. The study will run for five years. Data collected during the five year period will provide baseline information for future monitoring of the Peel River fish stocks. The Tsiigehtchic Renewable Resource Council initiated some preliminary work for a fish stock survey on Trout Lakes to assess whether the lake has potential for a sport fishing lodge. A crew fished at the lake for a week in August using a variety of fishing gear. Relatively few lake trout were captured. The Gwich'in Harvest Study collects information about wildlife harvested by Gwich'in beneficiaries. Harvesters are interviewed by community interviewers to find out numbers of each species harvested and the location of harvest. The third annual data report is being finalized. Harvest Study information is recorded in a GIS database. This is the final year of the Gwich'in Environmental Knowledge Project. A second book of Gwich'in traditional knowledge was published in the summer of 2001.

032 Biology

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Region: IN **Location:** Throughout the Gwich'in Settlement Area

Forestry Research in the Gwich'in Settlement Area
Forest health measurements were taken in the summer of 2000 at the national Forest Health Monitoring Plot (ARNEWS) with Canadian Forest Service staff. This plot is located in the Gwich'in Territorial Park. There has been no detectable change in the health of the trees in the plot since it was established in 1998. The project, 'Forest Fire Effects on Vegetation and Wildlife Habitat Use' was cancelled.

033 Biology

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Region: NS **Location:** Yellowknife

Development in the Coppermine River Basin and Cumulative Effects Monitoring
The goal of this research was to extend the research of the Steering Committee on Cumulative Effects Assessment in the Coppermine River Basin, and provide new information and insight to ensure the effective design and implementation of a cumulative aquatic effects monitoring program. Specifically, it examined positions and concerns of interest groups in the Coppermine River basin regarding future development, cumulative environmental effects of development projects and cumulative effects monitoring, and the design of a cumulative aquatic effects monitoring program (i.e., ecosystem goals and objectives, framework for cumulative effects assessment). Document review and key informant interviews including a questionnaire were utilized to collect qualitative information.

Contaminants

034 Contaminants

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Region: NS **Location:** Gameti First Nation

Metal Levels in Fish from Lakes in the Dogrib Region Surrounding Rae Lakes

This project developed out of a community concern about the effect local contaminants may have on their health and well being. The objectives were to establish baseline data on the level of metals in fish from lakes that are commonly used as traditional harvesting grounds for the community of Rae Lakes. Another objective was to present this data to the people in the community and address any concerns. During the project people from Rae Lakes were selected and taught certain research methods relevant to this study. The long term objective is to establish an integrated monitoring program that will identify contaminant levels on a lake-by-lake basis. Field sampling occurred during the summer of 2000. Lake trout and round whitefish were harvested from the two lakes in this study and then sent to Yellowknife for further analysis. The analysis tested for mercury in the liver and the presence of eight other contaminants in the tissue only. Other data included fork length, weight and sampling for aging structures.

Fossils

035 Physical Sciences

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Reference Number: 12 412 038
Region: SA **Location:** Rockslide Pass, Wrigley Lake

Trilobite Biostratigraphy of the Middle Cambrian Rockslide Formation (southern Mackenzie Mountains)
Although a permit was requested to continue paleontological field work during the summer of 2000 in the southern Mackenzie Mountains, an expedition was not mounted. Thus, no field work was conducted, and research was focused instead on material collected earlier. This material includes fossil specimens of extinct trilobites, brachiopods, tiny gastropods and reefs of Middle Cambrian age.

Geology

036 Geology

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Reference Number: 12 404 506
Region: NS **Location:** Yellowknife area, Hearne Lake to Gordon Lake, Beniah Lake to Lac de Gras, Acasta River area, Point Lake area.

Thematic Structural, Stratigraphic and Geochronologic Studies of the Slave Structural Province.
The study focussed on the relationship between very ancient rocks in the central, southern and western part of the Slave Province and the adjacent volcanic and sedimentary rocks. Recent work has concentrated on age dating and deducing the origin of quartz-rich sedimentary rocks (*circa* 2.8 billion year old beach deposits) that overlie the ancient gneisses in the central part of the Slave Province. These results were published this spring and a PDF file of the research paper is included with this report. Related results on younger sedimentary rocks are currently being prepared for publication. Tracing of certain volcanic and sedimentary rocks (e.g., the Burwash Formation such as that exposed east of Yellowknife) shows that these *circa* 2680-2660 million year old rocks can be followed from east to west across the Slave craton, thus overlapping the ancient basement rocks in the west and younger basement rocks in the east. The fundamental east-west difference in the Slave Province, i.e. >3 billion year old basement in the west versus < 3.0 billion year old basement in the east, must therefore have been established prior to deposition of the 2680-2660 million year old volcanic and sedimentary rocks. Results pertaining to this finding, stemming from 2000 field work, were published as a Geological Survey of Canada Current Research Paper.

037 Geology

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Region: NS **Location:** Walmsley Lake

Geological Mapping in the Walmsley Lake Area, parts of NTS 75N NT

The Walmsley Lake Mapping project began June 6th with the geological mapping traverses being carried out on foot from camps on Fletcher Lake, Anarin Lake, Reid lake, Back Lack, Lac de Charlot and Aylmer Lake. Structural information defining three phases of deformation within sedimentary and volcanic rocks was collected. Fold interference patterns within the map area form a dome and basin pattern defined at map scale by openly folded sheets of granite within the sedimentary rocks. Laboratory work by this researcher will give information on the pressure and temperature history over time for the rocks in this area. Laboratory work will define isotopic providence and age of various granitoid lithologies in the area. Fieldwork is expected to start in early June for the 2001 field-season. Priority will be given to filling in foot transverse coverage in the area between Black and Fletcher Lake.

038 Geology

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Region: NS **Location:** Yellowknife

Surficial Geology and Till Geochemistry of the Yellowknife Greenstone Belt Area.

Geological fieldwork along the Yellowknife Greenstone Belt was completed to provide information on ice flow history resulting from the effects of the last ice age which ended about 8500 years ago, and soil/plant geochemistry. Because of the large area involved (from Yellowknife to Discovery Mines), we traveled by helicopter. Soil samples will be analyzed to see if they contain gold grains. Spruce bark and Labrador tea twigs were collected for geochemistry studies. Pebbles were also collected for glacial transport investigations. Some larger soil samples were also collected around Drybones Bay for Kimberlite indicator mineral and gold grains, as part of a detailed study started in 1999. Silty clay, deposited thousands of years ago by a large lake, much bigger than Great Slave Lake is today, is common in low valleys and outcrops below 280 m elevation. A mixture of stones, sand and silt forms a deposit called diamicton (till) which was left behind by the glaciers moving across bedrock. Glaciers generally advanced from the northeast towards the southwest. The work we do is important because we analyze the soil samples looking for economically important elements such as gold, as well as potentially harmful ones such as arsenic. The background data we collect helps other geologists look for new gold deposits and kimberlites (diamonds). This information also helps environmental studies.

039 Geology

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Reference Number: 12 404 545
Region: IN **Location:** Mackenzie Delta

Near-surface Ground Ice in Sediments of the Mackenzie Delta Region, NWT

This project looks at the physical and chemical characteristics of near-surface ground ice in sediments of the Mackenzie Delta area. Permafrost cores were obtained along transects perpendicular to shifting channels in the Mackenzie Delta. This type of sampling showed near-surface ground ice accumulation over time and the site characteristics that favor ground ice accumulation. A relationship has been established between ground ice and vegetation type indicating that vegetation communities may be used to predict the amounts of near-surface ground ice in sediments of the Mackenzie Delta. Field data also suggest that ground ice development influences spruce forest succession in the Mackenzie Delta, through the tilting and eventual toppling of trees. Cores were also obtained from sites at Navy road near Inuvik where active layer development has been documented since the late 1960's (Mackay, 1995). The record of active layer history (Mackay, 1995) has given the investigation of near-surface ground ice development over 10 year time scales, while the tentative identification of deep thaw unconformity at the site may provide a stratigraphic marker at the millennial time scale. From early results, it looks like the near-surface ice-rich zone of permafrost is nutrient-rich relative to the base of the active layer. This finding may be important in understanding fire ecology in permafrost lands, since after intense burns, active layer thickness increases, resulting in the thaw of near-surface permafrost.

040 Geology

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Reference Number: 12 404 312
Region: DC **Location:** Fort Liard area

Central Foreland NATMAP Project
Existing reconnaissance maps of the project area, published in the mid-70's, are based on mapping dating from the 1940's and 50's. The Central Forel and NATMAP Project is designed to update and improve the quality of these bedrock and surficial geological maps, to provide a more accurate basis for making informed decisions about land use and resource potential. Also, the project is designed to provide a logistics platform to give university-based graduate research projects access to areas that are too expensive for individual researchers on their own. New bedrock mapping based from Fort Liard and from fly camps, included Mount Martin, Pool Creek in the Yukon, and Fisherman Lake and Mount Flett in the NWT. Surficial mapping defined how far the glacial deposits went over much of eastern La Biche River and western Fort Liard map areas. Two new graduate thesis projects were begun. New mapping changed the age and distribution of rock units in Pool Creek and Mount Martin, with less drastic changes for Mount Flett and Fisherman Lake. Also, the structures that form the mountain ranges are principally large folds. Large faults are less important than was thought before. The Mount Martin anticline is not connected to the Kotaneelee anticline farther north. This has implications for gas exploration in the area because some gas pools (such as Kotaneelee) may not be connected to nearby pools at depth. Much of the area is likely to have landslides occur. An important task for our surficial mappers is to delineate areas of high landslide potential. This is an issue of immediate concern for economic and public safety reasons, in particular with respect to the safe placing of well pads, roads and pipelines. Two new geological maps and three short current research papers have already been published. These significant improvements in the current state of geological mapping have occurred after only one month of fieldwork. Over the next two summers, we expect to continue to improve our knowledge of the regional geological framework.

041 Geology

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Reference Number: 12 404 557
Region: DC SS **Location:** Hay River, Enterprise, Fort Simpson

Distribution of Late (Frasnian) Devonian Crinoids in the Hay River and Mackenzie River Regions of the Northwest Territories, Canada

In September, a total of 12 places in the Northwest Territories were visited in an area that extended from the Hay River immediately north of Enterprise to areas along the Poplar River approximately 40 km west of Checkpoint. The researcher was interested in studying the fossil crinoids found in the Late Devonian (Frasnian Stage) rocks that are sporadically exposed between these areas. Over the past 80 years 14 different species of fossil crinoids have been described from this region, making it one of the most diverse Late Devonian crinoid faunas found anywhere in the world. It has only been in recent years that the Devonian rocks from the MacKenzie River region have been shown to be like rocks outside this area. During my two-week visit I was able to visit all but two of the localities know to have produced crinoids; high water in the Jean Marie and Redknife Rivers stopped me from studying those sections. Fragmentary crinoid remains allowed me to determine with confidence the composition the crinoid fauna from each major rock unit. The Canadian crinoid faunas are similar to faunas studied earlier in 2001 from New Mexico and to fossils studied in both Belgium and Germany. The Frasnian crinoid fauna is turning out to be very cosmopolitan, with basically the same genera and possibly the same species occuring throughout the world. Frasnian crinoid communities are quite different in diversity and composition than either earlier or later Devonian/ Mississippian faunas. This is probably due to the fact that the Frasnian represents a period of time between two major marine extinction events. The nature of the Frasnian crinoid fauna offers some clues to the cause of the series of world-wide Late Devonian extinctions.

042 Geology

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Reference Number: 12 404 398
Region: IN SA DC **Location:** 60 sites from Fort Simpson, to the Beaufort Sea

Active Layer Monitoring Network in the Mackenzie Valley

During July and August, the 10th annual survey of the active layer monitoring system in the Mackenzie Valley was completed from Fort Simpson to the Arctic coast. There are now 55 sites,with about half in the Mackenzie Delta. Water filled clear plastic observation tubes record maximum depth of thaw each year. Air and ground temperature recorders provide a thermal record at many sites. When possible, sites are close to automatic weather stations and shared with research groups doing complimentary work. Along this 1400 km transect, active layer thickness varies more as a result of local factors related to situation than to regional climate and latitude. Though the spatial differences are complex, over the last 7 to 9 years, thaw penetration is shown to be increasing at many sites over much of the system. The thaw of 1998 was the greatest yet recorded in keeping with record warm temperatures, while the thaw of 1996 north of Norman Wells was notably less than adjacent years also associated with temperatures significantly different from normals. The widespread response to these two events builds confidence in the utility of the instrumentation for measuring response in the ground to atmospheric change. In the longer term, measurements from this transect will be used to help model climate change impact on near surface permafrost in this fragile environment.

043 Geology

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Reference Number: 12 404 548
Region: NS **Location:** Yellowknife, Kennady Lake, Snap Lake and Lac de Gras

Teleseismic Studies in the Lac de Gras Area

One teleseismic station has recorded distant earthquakes from around the world at the Ekati Diamond Mine site since March 1999 as have four other stations on the Ekati, Kennady Lake and Snap Lake properties since their installation in August 2000. Joint analysis of the Ekati site data and older regional survey results show that at least two layers exist under this region. A deep, thick (200+ km) layer has characteristics related to the general plate motion of North America; a shallow, thin upper crustal layer can be related to large-scale fold structures mapped by geologists across the region. The ongoing recording of more earthquakes at the existing five stations, plus additional new seismic stations, will improve the accuracy of these early results and define better the characteristics of these two layers. To date no clues have appeared in our seismic data as to why some regions contain diamond-bearing kimberlite deposits and others do not although some interesting electric current conductor anomalies have appeared in electro-magnetic survey

Health

044 Health

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Reference Number: 12 408 067
Region: IN, SA, SS **Location:** Ft. McPherson, Tulita, Ft. Resolution

Food Choice Decisions by Western Arctic Aboriginal Women and Children

The goal of this project is: (1) to understand the factors influencing food choices by Arctic women and children, so that risk and benefit messages are relevant and appropriate for effective education; and (2) to understand children's use of traditional and market food. The three communities in Denendeh that were selected: to participate in the study were Fort McPherson, Tulita, and Fort Resolution. Field work was done in the NWT in November-December 2000. Dietary interviews of a hundred 10-12 year old children were conducted. Thirteen focus groups and individual interviews were held with female caregivers of these children. Data collected are being analysed. Twenty-eight factors responsible for food choices were identified, which were placed into 5 major categories: costs (in the broadest sense); availability (of both traditional and market food); food preferences; physical and medical reasons (age, gender); and knowledge (traditional knowledge, contaminants, labels). Information from the focus groups identified costs and availability of food as the most important factors for food choices in these communities. Contaminants were rarely mentioned as a reason why people selected, or would not select, one food or another. Interview information to be gathered during 2001 will further investigate these findings.

045 Health

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Reference Number: 12 408 067
Region: IN,SA,SS **Location:** Ft. McPherson, Tulita, Ft. Resolution

Nutrient Benefits of Arctic Traditional/Country Food

This study was carried out to provide new knowledge of nutrients in traditional/country food frequently consumed by Dene/Métis, Yukon First Nations and Inuit people, and to fill in the gaps when earlier food items were inadequately sampled. Fifty-five samples of traditional/country food were received from Inuit, Dene and Yukon First Nation areas. These included several samples of caribou bone marrow, lake trout, seal flesh, walrus blubber, arctic char, caribou flesh, seal liver, walrus liver, smoked and dried whitefish, cranberries, fat made from caribou bones, fat made from grizzly bear bones, caribou brain, and clear spruce sap. Nutrients were analyzed using standard laboratory methods. Analyses are not yet complete. However, early results show that several Arctic foods are excellent sources of fatty acids. The polyunsaturated fatty acids were highest in moose fat, salmon eggs and cooked flesh with these fish samples having the highest n-3 fatty acids. The results of this project give new nutrient results for Arctic traditional/country foods. These data contribute a lot to the nutritional information available, and make a valuable contribution to benefit: risk assessment on the use of Arctic traditional/country food, as it becomes clearer that these food items should be protected and included in the diet whenever possible. This work on nutrient benefits in Arctic traditional/country foods is ongoing.

046 Health

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Reference Number: 12 408 116
Region: IN **Location:** Communities in Sahtu, Gwich'in and Inuvialuit Settlement Region

Inuvik Regional Human Contaminants Monitoring Program

The Inuvik Regional Human Contaminants Monitoring program began in 1997 and reached completion in July 2000. As a partner with other northern countries, the Northwest Territories is involved in monitoring programs for environmental contaminants. As part of this initiative, the Inuvik program looked at what types of contaminants may be found in mothers and babies of this region (like metals and polychlorinated biphenyls (PCBs)). Other regions in the NWT and Nunavut have completed this type of study, and our region will help complete information on contaminants in the Northwest Territories. One hundred and four women participated from across the region, filling out dietary & lifestyle surveys, and providing hair and blood samples. Most contaminants measured were found in low levels in this program. The results tended to be lower than the Eastern Arctic, and other regions such as Greenland. It is not known what types of health effects may come from these low levels, we only know that low contaminant levels don't appear to be causing obvious health problems. The study also showed the importance of traditional food consumption. Traditional foods have many health benefits and can provide the same or better nutrition than store-bought foods. Contaminants are low in most traditional foods, but tend to build up in the fat and organ meats in older animals, and animals which eat other animals. A regional report was created in July 2000 and is available at all community health centers, the Inuvik Hospital and Hamlet offices.

Physical Sciences

047 Physical Sciences

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Reference Number: 12 404 325
Region: IN **Location:** Illisarvik, Richards Island, Garry Island

Permafrost Investigations, Western Arctic Canada
The 2000 field research was concentrated at Illisarvik (the lake drained in 1978 to study permafrost growth); at Garry Island and near Inuvik. At Garry and near Inuvik, ground temperatures and ground movement associated with annual warming and cooling of the ground are being monitored. At Inuvik, measurements were taken of how tree tilting is associated with ground warming and cooling where annual oscillations in tree movement have been detected as a result. The tree movement is associated with the "drunken forest" characteristics of northern Canada. At Illisarvik work on the growth of permafrost was continued and new temperature cables have been installed. Grass was cut from a large part of the lake bed in order to reduce the snow cover, cool the ground and restart ice-wedge cracking. The wedges stopped growing as snow depth increased due to development of vegetation.

048 Physical Sciences

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Region: IN **Location:** Campbell Lake area

Paleo-hydrology in the Arctic

Our field investigation occurred in a limestone/dolostone terrain south of Inuvik along the Dempster Highway. Exposed outcrops contained abundant biogenic calcrete deposits along fracture surfaces at several locations. Previous investigations had revealed that these calcretes were formed during a warmer climate when the permafrost was deeper and there was greater groundwater movement. We have also successfully cultured the microorganisms that we believe are responsible for creating these biogenic deposits. To compliment the laboratory experiments, we proposed a field sampling program within the limestone terrain to examine the in-situ geochemical conditions of shallow surface waters in contact with the active layer of soil which the microbes currently inhabit. Three weeks of continuous monitoring and sample collection were accomplished in June and July. The most encouraging result was the detection of significant quantities of dissolved methane in the waters. The soils were tested for carbon sources, and carbonate mineral phases were almost entirely absent, meaning that increases in dissolved inorganic carbon (DIC) had to be the result of organic matter decomposition. Since methane-generating bacteria are dependent on other microbes to generate the simple organic substrates they need, these results support the presence of active methanogens in the soils. Moreover, isotopic analysis showed that DIC is enriched in ^{13}C compared to organic matter, and without the presence of limestone in contact with the soil and water, it is feasible that DIC is being fractionated by CO_2-reducing methanogens. The greatest change in conditions over the three-week investigation was mostly due to evaporation of snowmelt; the weather was warm and dry for the first half of the monitoring period. Otherwise, the geochemical and isotopic results showed much consistency, indicating a well-balanced system. More work needs to be accomplished before more refined conclusions can be reached.

049 Physical Sciences

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Region: IN **Location:** Holman

Younger Dryas and Postglacial Threshold Events in the Western Canadian Arctic

We did field research out of four camps located along the Prince Albert Sound, two on the south shore and two on the north. A primary objective was to locate sediments with marine shells (fossils) that would allow us to determine the time when the glacier retreated from the area at the end of the last ice age, at which time it built large sets of end moraines, which in one area are called the Coville Mountains. This objective was accomplished at three of the camps and several of the shell samples have been dated by the radiocarbon method. These dates confirm our earlier suggestion that the moraines date from an interval of time known as the Younger Dryas (10,000 to 11,000 years ago). That was a time when the climate became much colder in the North Atlantic region than it had been just before. The moraines on Western Victoria Island indicate that this same cold event affected the western Canadian Arctic, a fact that had not been demonstrated prior to our work. A second objective was to locate fossil remains of bowhead whales to determine when these animals were able to live in the region. We found and collected samples from 14 bowheads mainly located on the south shore of the sound. Ten of these are currently being radiocarbon dated. A final objective was to collect shells that would allow us to define how fast the sea level has been changing over the last 10,000 years and to determine when some warmth-demanding species of mussels and clams have been able to survive in the area. We were fairly successful in meeting this objective, but several more areas need to be explored before we have a firm interpretation.

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Region: IN **Location:** Mercy Bay, Banks Island

Paleoecology of Mercy Bay Reefs, Frasnian, Banks Island

The Devonian (Frasnian) aged (ca. 350 million year old) fossil reefs of Mercy Bay, northeast Banks Island are important examples of fossil coral reefs that grew in a sand and mud environment on a broad continental shelf. These reefs may also be able to provide insight into the nature of a reef ecosystem immediately before a time of global reef collapse. The team took aerial and ground photographs, measured stratigraphic sections, described rocks and fossils from 28 locations within the Mercy Bay reef tract, and collected samples of reef-building corals and sponges for lab analysis. Our research showed that there are three distinct levels of reef limestones in the Mercy Bay reef tract, separated by approximately 100m thick bodies of sandstone and siltstone. These three levels of reef development may correspond to global sea level highlands. Age estimates of the three reef levels and intervening sandstones based on microfossils may help clarify the relationship of the fossil reefs to global sea level changes. The uppermost layer of some reefs is composed of angular fragments of sponges, corals, and algae, and may have accumulated in the surf zone. Large areas of the limestones, however, are not composed of reefs, but rather, of bituminous fine-grained limestones that probably accumulated in quiet water behind a barrier reef. Each reef typically grew on top of sands or muds, and was first dominated by branching and flat corals. Later in reef growth, domal and tabular sponges became the main reef-builders. About four different varieties of sponges, and seven varieties of corals were common in the reefs. In addition, micro-organisms precipitated limestone to form the cores of some of the reefs, particularly in the lowest level reefs.

051 Physical Sciences

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Reference Number: 12 404 425
Region: NS **Location:** Daring Lake

Spring Melt Hydrological Investigations at Daring Lake, N.W.T.

Research conducted at Daring Lake, N.W.T. located in the Slave Geological Province of the Coppermine River Basin (64°52' N, 111°35' W) in the spring of 2000 examined snowpack depth and distribution as well as snowmelt and active layer development. The study site, Kakawi Lake basin (14 ha), is located approximately 2 km north of the Tundra Ecosystem Research Station (TERS) which is run by the Resources, Wildlife and Economic Development (RWED). A snow survey in late May consisted of measuring the snowpack depth and extracting snow samples in corers of predetermined volume at approximately 300 sites from which water equivalents were determined. During this survey we found large scale ice features formed within the snowpack along the 'western' side of the basin in the upper elevations down slope from the break in gradient. Efforts were made to document the extent of this feature and to excavate it at one site in order to quantify the volume of space that the high density ice features were occupying. During the melt season the Kakawi Lake meteorological station was put into operational mode and soil temperature and water content probes installed the previous year were monitored to determine daily changes in subsurface energy fluxes. Depth to permafrost table was also measured daily at approximately 30 sites to quantify spatial and temporal variability in active layer development within the study basin.

052 Physical Sciences

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Reference Number: 12 404 555
Region: SS **Location:** Slave River Delta

Channel Morphology Studies: Slave River Delta

Research was conducted at the Slave River Delta, N.W.T. (61°13' N, 113°38' W) from June 1 to October 21. The research investigated the hydrodynamics and sediment transport processes of the Slave River Delta during the open water season. The nature of the hydrodynamics of the Slave River Delta is complex, influenced by the flow of the Slave River, the water level of Great Slave Lake and the occurrence of seiche events at the delta. Seiche events at the Slave River Delta are characterized by water set-up at the delta distributaries caused by strong winds blowing from the north and northwest across Great Slave Lake. Water levels were monitored at various locations in the delta to determine the occurrence of seiche events and the impacts of those events on the hydrodynamics of water flowing through the delta system. Wind speed and direction were monitored at the outer portion of the delta. Sampling of the amount of water flow and the amount of sediment transported by several distributaries in the delta was completed over the course of the period in the delta. These measurements were taken to assess the impacts of seiche events on water flow and sediment transport through the delta. Sediment core samples were extracted from various locations in the outer portions of the delta to assess the change of sediment characteristics, with respect to the changing form and hydraulic nature of the Slave River Delta through time

053 Physical Sciences

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Region: IN **Location:** Parson's Lake

Parson's Lake Seismic Research Project

The environmental impacts of using dynamite in a fish-bearing water-body were monitored during a two-dimensional summer seismic research program at Parson's lake in August and September. The clarity of the lake water was monitored during drilling and although sediment concentrations may briefly exceed guideline limits, the increases were generally short-lived and only around the drill stem. The suspension of the sediment associated with seismic exploration would likely not impact aquatic life. Shock wave data was collected while setting off 32 charges. Shock wave pressures can be maintained at less than the Department of Fisheries and Oceans (DFO) criterion for protecting fish when charges are placed at adequate depths into the lake bottom. A limited investigation of ground movement indicated that by altering charge size and depth of burial, the DFO criterion for protecting fish eggs could be achieved. Water and sediment samples were collected in Parson's Lake and five other lakes: Noell, Jimmy, East Hans, West Hans and Zed. Water and sediment samples collected in Parson's Lake near the location of an accidental bentonite spill in the 1970's indicated that it was not possible to identify any of this material based on particle size or trace metals.

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054 Physical Science

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Region: NS **Location:** Snare River

The Snare River Mapping project, parts of NTS 85O and 85N

In June to August, geological mapping for the Snare River project (DIAND, NWT Geology Division) was focussed around Cowan Lake and Wheeler Lake (NTS 85O). A satellite camp of two people was also supported and consisted of a PhD candidate at Memorial University in Newfoundland, and her assistants. Mapping is aimed at improving existing, old and less detailed maps, for example pre-existing maps of the project area were completed in the 1930's. About 200 fist-sized rock samples were collected, some of which were examined under the microscope to better determine their composition. Other samples were collected to obtain information about their age of formation and events that effected them thereafter. Mapping determined that some rocks previously interpreted as granitic were actually metamorphosed sedimentary and volcanic rocks and revealed banded iron formation (BIF) that appeared similar to the BIF at Russel Lake (host to the Bugow gold deposit). There were 7 rock samples examined for their gold and other metal contents, but none have shown promising results.

055 Physical Sciences

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Region: SA **Location:** 250 km South-west of Tulita

Ecological and Geomorphological investigations in the alpine tundra of the Mackenzie Mountains, N.W.T.

A very brief field season was conducted in the study area (6-8 August). The main purpose was to retrieve data from the automated microclimate stations and to check the depth of thaw on the study features. One station was down due to a problem with the logger and it was removed for repair so there will be no data for this site until the logger is replaced in 2001. Several stations had animal damage but nothing too serious.
The data collected since 1990 will be included in a paper being prepared for the August meeting of the Canadian Quaternary Association in Whitehorse.

056 Physical Sciences

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Reference Number: 12 404 116
Region: SA **Location:** 10 km North of Tulita

Studies of the environmental effects of disturbances in the subarctic (SEEDS)

A brief field season was conducted on the study site (9-15 August). Unfortunately the electric fence had been turned off by unknown persons during the winter. This permitted bears to access the stores at the base camp which resulted in loss of cached food and destruction of equipment. As a consequence, the decision was made to suspend further use of the site and all materials of value were removed after cleaning of the camp area. The stored data on the automated microclimate stations was taken off and the stations were dismantled. Should there be a desire in the future to restart the monitoring it can be done easily since all the permanent markers were left on the research site.

057 Physical Sciences

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Region: IN **Location:** Mackenzie Corridor

Mackenzie Corridor Phase III Aeromagnetic Survey

During the summer of 2000, the Geological Survey of Canada (GSC) continued with the third phase of the multi-year airborne magnetic survey over the Mackenzie Corridor region of the Northwest Territories, which commenced in the summer of 1998. The survey was carried out from May 9 to July 31 over the Mackenzie Delta area and was entirely airborne, with no land access. The purpose of this survey was to improve the public knowledge and understanding of the geology of this area as no publicly available magnetic survey coverage exists. The survey recorded the variation in the earth's magnetic field caused by magnetic minerals contained in the rocks of the earth's crust. The patterns obtained are indicative of the subsurface geological structure and will be used as an important element of geological mapping and resource exploration. Approximately 74,940 line kilometres of data were acquired. The survey digital data is currently being processed and the survey results will be published by the GSC as 10 colour Aeromagnetic Total Field Magnetic maps at a scale of 1:100,000. The GSC will be the source for the public distribution of the data once it is compiled and published. These will be released on April 1, 2002. Maps and digital data will be available from the Geophysical Data Centre, 615 Booth Street, Room 241 Ottawa, Ontario

058 Physical Sciences

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Reference Number: 12 404 553
Region: IN **Location:** Willow Creek Basin

Retrogressive Thaw Slides in the Richardson Range: Climate Change Indicator

Several authors have suggested a period of warmest climate and greatest thermokarst activity in the Yukon Coastal Plains, and in the Mackenzie Delta during the early Holocene, between 10 ka – 8 ka Bp. In June 2000, fieldwork was undertaken within Willow River's basin to examine tabular ice-rich sediment within active polycycle thaw slumps. Ice-rich sediments were collected from the various units for stable isotope analysis ($d^{18}O$; dD). Two sedimentary units were found. This was an ice-rich diamict (unit 1) with basal glacier ice underlying an ice-poor re-worked diamict and a fossil slump floor(unit 2). Within unit 1, suspended fine and coarse sediments are present. At the contact, erosional in nature, an irregular reticulate network of ice and sediment fines are present which grades into a fine lenticular structure. Clumps of sods resulting from past slumping activity are present throughout unit 2. Fifty-one samples from unit 1 were analyzed for $d^{18}O$ and for dD. For unit 2, 31 samples were analyzed for $d^{18}O$ and for dD. The low values characterizing unit 1 are similar to the values from Pleistocene massive ice in the Tuktoyaktuk region. The isotopic difference between unit 1 and unit 2 is similar to the Pleistocene-Holocene transition that is responsible for a $d^{18}O$ shift of approximately 7 per mil. This linear relationship is similar to the global meteoric water line defined by Craig suggesting that the ice originated directly from atmospheric precipitation and was subject to minimal modification by refreezing or evaporation.

059 Physical Sciences

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Region: IN **Location:** Mackenzie Delta near Inuvik

Biogeochemistry of Lakes in the Mackenzie Delta
This project is on-going and the long-term goal is to develop a biogeochemical model for lakes in the Mackenzie Delta and ultimately a more general ecosystem model for lakes in the flood plains and deltas of major world rivers that could help assess the effects of multiple stresses on rivers as a result of global change. Specific goals the research program included 1) evaluating the relation between aquatic plant biomass and the type of lake connection with delta distributary channels and 2) a preliminary assessment of the degree to which thermokarst erosion of terrestrial plant material may affect aquatic plant biomass. During August, abundances of aquatic plants, water transparency and sediment characteristics were measured in two lake-chain systems (Taylor Channel and Reindeer Channel systems) and from this the research team was able to confirm differences in aquatic plant biomass within these lake-chains relative to single lakes with similar water transparency. Laboratory experiments were also completed on phytoplankton samples from turbid, clear and thermokarst lakes, and they were able to confirm the thermokarst lakes responded differently to the addition of river sediments and nutrients than other lake types. Results from
earlier work have been submitted for publication.

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060 Physical Sciences

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Reference Number: 12 404 378
Region: IN **Location:** Trail Valley and Havikpak Creek

Snow Accumulation / Runoff in High Latitude Permafrost Basins
This study continues to consider the factors controlling the movement of energy and water between the land surface and the atmosphere during the spring, summer and fall periods. Field activities were limited to brief site visits to download meteorological data from remote stations and to carry out measurements of the distribution and amount of snow on the ground at the end of winter. The major activities during 2000 were the analysis of these data, along with similar data collected over the past 8 years. This work is developing an extensive, decade long data base of the hydrologic conditions at tundra and forested sites in the Caribou Hills and Inuvik areas. Such data is required in order to document changes in snowcover, precipitation, and streamflow, and for testing a variety of hydrologic, climatic and weather models. Such models play an important role in predicting future changes in hydrology, with such changes occurring as a result of both ongoing resource development and climate change. However, our confidence in the accuracy of these models can only be determined by rigorous testing against high quality data sets for present conditions.

061 Physical Sciences

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Reference Number: 12 404 556
Region: IN **Location:** Lake Illisarvik, Richard Island

The Influence of Snowcover on the Ground Surface Temperature in Permafrost

The objective of this field study was to investigate how cold the ground surface gets below snow covers of different depth. Of particular interest was the difference between behaviour while the active layer (the unfrozen soil above the permafrost) is re-freezing in autumn and what happens throughout the winter after it is frozen. The investigation involved measuring snow depth, air temperature, near surface ground temperature and shallow permafrost temperature at ten sites along a 600 metre transect on a hillslope east of lake Illisarvik. Seasonal maximum snow depth along this transect varied from 12 cm to over 4 m at these sites in the previous winter. During August field work, data loggers were installed for recording data over the coming year and active layer depth was measured by probing all sites. Thickness and properties of the snowcover were monitored during visits over the winter, and data loggers were recovered after 1 year.

062 Physical Sciences

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Reference Number: 12 404 189
Region: IN **Location:** James Creek

Geomorphological and Hydrological Research on Valley Formation in Arctic and Subarctic Environments

Research was carried out in the summer of 2000 on the fluvial processes induced by spring snowmelt and summer rainfall in two small stream valleys. At the end of winter, the floors of these flat bottomed valleys are ice-covered along most of their length. The largest quantity of meltwater passes in an ice channel on top of the aufeis, with flow rates up to 4.8 meters/second. The main solid-sediment transport takes place through the short runoff interval, when the stream channel has entrenched the aufeis in some places. The calculated suspended load transport during snowmelt is in the valleys examined ranges from 62-313 tonnes/km^2, while in summer the calculated sediment transport ranges from 0.2-1.4 tonnes/km^2. Average annual suspended-sediment yields were calculated for the two creek basins examined. The average annual suspended-sediment yield for Douglas Creek was 328 tonnes/km^2/year, while the yield for Andy Creek was 71 t/km^2/yr. The average annual solutes yield for Douglas Creek was 52 tonnes/km^2/year, while the yield for Andy Creek was 19 tonnes/km^2/year. Total equivalent surface lowering rate by fluvial solids transport in the Douglas Creek Basin was 850 mm/1000yrs, while the Andy Creek Basin lowering rate was 350 mm/1000yrs.

063 Physical Sciences

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Reference Number: 12 404 547
Region: IN **Location:** Banks Island

Water Quality Assessment and Climate History of Selected Ponds and Streams on Banks Island

The Arctic is extremely vulnerable to environmental changes, such as climate warming, and is distinct in the way that it responds to shifts in the climate and affects the environments of the rest of the globe. It is an extremely critical area to understand ecologically and to monitor on a long-term basis. Arctic ecological data are sparse, and little baseline and historical aquatic environmental data exists. This data is necessary to make predictions about future environmental changes in the Arctic. Physical, biological and chemical limnological and paleolimnological information from the lakes and ponds that dot the Arctic tundra in such regions as Banks Island can provide a means of getting this data. Banks Island is of special interest because of its lushness, and because it contains several different biomes. The Paleoenvironmental Assessment Laboratory (PAL) at the University of Toronto (Dept. Geology), and the Paleoecological Environmental Assessment and Research Laboratory (PEARL) at Queen's University focus on getting baseline and historical limnic data from the High Arctic using paleolimnological techniques. Fossilized freshwater algal remains of diatoms (typically the dominant algal presence within high arctic lakes and ponds) are used as indirect proxy indicators of past environmental changes and provide needed baseline data. In order to get baseline and historical limnic data from the lakes and ponds on Banks Island, the research team collected water samples, diatom surface sediment collections, and diatom samples from moss and rock substrates, as well as zooplankton, from Banks Island over the period of June 23 – July 5th. Sediment cores were taken from three different lakes on Banks Island, and will be analyzed in order to reconstruct past environmental and climate changes in the Banks Island area. A total of 46 sites were sampled throughout Banks Island, including 15 sites within the Aulavik Park boundaries. Sites were selected in order to cover a wide environmental spectrum (e.g. altitude, proximity to sea, size, drainage characteristics, vegetation, etc.). Banks Island water samples were sent to the National Water Research Institute in Burlington, Ontario for analysis, while diatom collections and sediment cores remained at PAL and PEARL for storage and future analyses. These analyses will include defining the ecological optima and tolerances (autecology) of the dominant diatom species by relating surface sediment assemblages to measured limnological variables. The result of this process will be the construction of a calibration set that will applied to Banks Island sediment cores in order to quantitatively reconstruct past environmental changes.

064 Physical Sciences

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Reference Number: 12 404 319
Region: IN **Location:** Inuvik, Tuktoyaktuk, North Head, Tibjak Point, Atkinson Point, Tent Island, Taglu Island, and Ellice Island.

Coastal Impacts of Climate Change

Coastal water levels were monitored during the summer of 2000 using compact pressure gauges. Several of them were in place during a severe summer storm that occurred during the field season. We were able to measure the height of the surge (maximum 2.1 m at Tuktoyaktuk) which accompanied the storm at several locations and to survey the impacts of the storm immediately after it occurred. In Tuktoyaktuk, flooding swamped the road to the Recreation Centre and the spits and erosion (5- 10 m) occurred in several locations. The newly installed shore protection was effective, but was nearly overtopped during this event. This water level is expected to recur about once every 10-15 years. Similar size events took place in 1993 and possibly in 1999. We are unsure about the severity of the 1999 storm surge because there were no water level gauges in place, the tide gauge having been removed from Tuktoyaktuk in 1997. Extensive bluff erosion occurred on Tuktoyaktuk Island as a result of undercutting and block failure. High rates of erosion also occurred at North Head, along parts of the Mackenzie Delta front and along the Yukon coast (e.g. 3-5 m of erosion at Komakuk).

Social Sciences

065 Social Sciences

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Region: IN **Location:** Inuvik

Transition Session- Campus Director / Performance Appraisal

The impact of 11 interventions made by an interim Campus Director at a small community college in northern Canada were examined in 4 case studies. Action research was used in 8 of the interventions; 3 interventions were unplanned. The client system for this study were the staff who worked at the Aurora Campus of Aurora College, in Inuvik, Northwest Territories, Canada. The primary goals were to (a) decrease the number of staff sick days and medical costs, (b) increase the sense of teamwork felt by the Campus Director's direct reports, (c) increase job satisfaction, (d) have staff feel more productive, and (e) ensure a smooth transition between this Campus Director and the next. While action research provided the primary structure for the interventions, there were a number of theorists who also had an impact on either planning for the interventions or in clarifying what happened in the interventions. These were R. Greenleaf and his ideas on servant leadership; M. Wheatley and J. Jaworski and their ideas on relationships; E. Friedman and R. Heifetz and their ideas on systems, triangulation, and giving the work back to the people; and D. Conner's ideas on sponsorship and change. As a result of these interventions, there was no decrease in either the number of staff sick days or medical costs. Although comments from direct reports indicated that the interventions did make a positive difference for them, surveys (including R. Crosby's 25 High Performance Factors) indicated no significant change in the sense of teamwork, job satisfaction, or productivity. There was statistically significant change in follow through, training, and decision making. A goal that was achieved was a smooth transition between this Campus Director and the next.

066 Social Sciences

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Reference Number: 12 410 560
Region: NS **Location:** Gameti

Converging Ecological Currents: A First Nations Ecovisitor Strategy

The purpose of this field research was to gain an understanding of a process involving culturally driven tourism discussion, evaluation, and preliminary operational planning - intended to contribute to economic development through sustainable tourism. Data collection took place mostly in the community of Gameti. The researcher witnessed a process involving the initiation of community discussion and planning, and the identification of cultural, physical, and natural assets. Work was centered on finding the way in which these assets could be included into tourism within the community. Data collection involved observing two consultants working within the community with the Gameti Elder's Council, community researchers, and the Gameti Development Corporation. Research was focussed upon observing the introduction and explanation of cultural tourism, potential objectives and benefits, limitations and costs, and the minimisation of impacts. The consultants were key informants. Findings indicate that elders agree that tourism might have more positive effects on the community than negative ones. They feel that ecocultural tourism is one way to teach non-Dogrib about themselves, their values, their beliefs and their love of the land.

067 Social Sciences

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Region: SA **Location:** Fort Good Hope

Alternative Sentencing in Fort Good Hope

My main data-gathering trip to Fort Good Hope last summer has significantly helped the development of this research project. During the time spent at a bush camp for offenders near Fort Good Hope, several interviews with both the operator and inmates at the camp were done. A detailed research journal of the researcher's own observations was also kept. In accordance with "grounded theory" methodology, the information gathered last summer was used to both form conclusions and generate questions. First, there is a potential for the efficacy of the bush camp in rehabilitation of offenders. It creates a healthy lifestyle and provides inmates with an environment that is peaceful and relatively free from distraction. In contrast to the strictly regimented and monitored life that inmates lead in penitentiaries, the bush camp allows for increased independence of choice and actions; surely this is an important step toward eventual re-integration into community life. Also, when viewed in the broader context of culture the Sahtu region, it becomes clear that the bush camp is part of general tendency to seek innovative solutions to today's social problems by looking to Dene traditional skills and wisdom. There are many more questions that are hoped to be explored this summer. This includes the potential for widening the scope of offenders eligible for the bush camp program and opinions of justice official in the community.

068 Social Sciences

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Reference Number: 12 410 572
Region: NS **Location:** Yellowknife and Hay River

Women and Empowerment in Northern Canada and India: A Community Based Strategy for Building an Ecological Sustainable Way of Knowing

In this research, semi-structured interviews library research, which included including reading books, magazines, journals; and newspapers (both new and old) were done. Before contact with the white man, Dene women were equal to Dene men. Men were chiefs, but the elder women were listened to, and held in high esteem. Women elders influenced Dene politics by stating their opinions to the husbands. These opinions were taken seriously, as they were a way of assessing the feelings of the community. In public gatherings, older women were likely to voice opinions about public policy decisions. Their status as elders secured their authority, as it still does today. When the white man came to the north, they were shocked by the position of Dene women in their respective societies. They realized that, in order to dominate the land and the people occupying it, they needed to dis-empower the women. Indigenous systems that give power to women were incompatible with the kind of colonial power dynamics necessary to maintain central power. In the case of the Northwest Territories, formal leadership went first to Dene men, with Dene women continuing to hold a minority position within decision making bodies. This has held back their ability to address women's concerns in political arenas, and contributed to their frustration with the existing system and desire for self government. Dene women have been kept out of government decisions, which directly affect their lives. The prospect of gaining self-government in the Northwest Territories, may allow for Dene women's participation to be more enriched and meaningful. It may be possible to avoid problems like that of the formation of the Nunavut government, where consensus-building was originally based on gender equity and in application, they simply didn't do it.

069 Social Sciences

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Region: SS **Location:** Thebacha Campus, Fort Smith

Negative Self-Attribution of Adults in Mathematics: Case Studies of Origin and Function

Four math students of Aurora College, Thebacha Campus, were interviewed during 1998-2000, chosen because of low confidence, anxiety or low ability in math, and/or learning helplessness. Questionnaires and tests were utilized to find out the four scores. Three of the four indicated a lack of topic understanding (communication problem), suffering teacher impatience, being humiliated and blaming themselves. Two tried to hide their difficulties (ego-defensive) and one tended to toward learning helplessness (temporarily). Although all identified problem handicaps, college and other experiences sparked hope and confidence to overcome. Two of the participants are pursuing college-based careers in 2000-01. Negative expressions such as, "I'm no good in math, " which several participants used, appeared to be more statements of teacher impatience rather than statements of enduring belief about themselves. Educators need to be aware of great diversity in student development and must be competent and flexible in teaching, especially in the elementary grades. Young children are especially sensitive to criticism and inevitably performance disappointments, but each child needs confidence building experiences.

070 Social Sciences

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Region: SS **Location:** Thebacha Campus of Aurora College, Fort Smith

Using Literature to Stimulate Critical Self-Reflection

In the spring, 14 interviews were done with students and teachers who were part of a study focussed on stimulating a form of thinking known as critical self-reflection (CSR) through the use of literature. The students were individuals who had shown this CSR form of thinking. Primarily they were identified through what they wrote down in their journals, but several students were identified through informal interviews using a teacher log form. The interviews were basically a way of gaining the participants ideas of what they thought it was in the class experience that led to their experience and expression of CSR. All interviews were written out and analyzed. Based on the results from this first round of interviews a second set of research with new strategies was carried out in the fall term of 2000 with a new class. The second set consisted of 12 interviews and was completed in January of 2001. This data was also written out and analyzed. A survey derived from the preliminary results was also given to the second class to further assess student and teacher ideas of what it is in the classroom experience with literature that stimulates CSR. No further data collection will be conducted.

071 Social Sciences

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Region: IN **Location:** Tsiigehtchic/Inuvik

Gwich'in Elders' Biographies Research Project

During the summer of 2000, interviews were done with seven elders in Tsiigehtchic, Inuvik, Aklavik and Fort McPherson. Altogether 30 hours of interviews were recorded and some interviews were also video taped. A student from Tsiigehtchic was hired and assisted in the interview process as well as the transcription of the audio tapes into written text for their biographies. The elders interviewed were very pleased to see this project being completed and felt that it was an important project. Currently one biography has been completed, two are now being amended and the further four are still in progress. The biographies completed have met with approval from the elders and communities. During the interviews, some Elders mentioned the story about Albert Johnson “The Mad Trapper of Rat River”. They talked about the role that the Gwich’in Special Constables Joe Bernard and Lazarus Sittichinli played during the confrontation. Since very little, if any, of the Gwich’in voices has been added to the events that occurred in 1932, a thesis paper about the Gwich’in involvement in this case will be completed. Copies of interviews conducted in Gwich’in have been made and will be/or have already been supplied to the Gwich’in Language Center in Fort McPherson. Family Tree history, as recorded, will be used in a further project by the Gwich'in Social and Cultural Institute.

072 Social Sciences

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Stefansson's Legacy

In July 2000, the project team visited as planned the town of Inuvik and the Northwest Territories. The team interviewed the descendants of the anthropologist-explorer Vilhjalur Stefansson, focussing on Frank, Georgina, Rosie and Shirley Stefansson. These were extensive interviews with interesting information on the relationship between Vilhjalmur Stefansson and his Inuit family as well as the history of his descendants. The film material is being processed and we anticipate a documentary film to be ready in Icelandic, by December. The film which is tentatively entitled “Somebody should know’: the legacy of Stefansson”, will hopefully be available in English as well as ext year. The interviewers were also useful for Gisli Palsson’s book *Writing on Ice: The Ethnographic Notebooks of Vilhjalmur Stefansson*;
see http://www.dartmouth.edu/acadinst/upne/1-58465-119-9.html. Necessary arrangements have been made for copies of the book to be sent to both the library in Inuvik and Stefansson’s grandchildren.

Traditional Knowledge

073 Traditional Knowledge

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Region: IN **Location:** Sachs Harbour

Inuit Observations on Climate Change

Inuit Observations on Climate Change had two goals. The first relates to public awareness on climate change; the second to the relationship between traditional knowledge and scientific research on climate change. The first goal was to produce a video that will demonstrate to Canadian audiences, interest groups and decision-making forums that climate change is making an impact on the traditional lifestyle and livelihood system of Inuit on Banks Island in the Beaufort Sea. The second goal was to understand the traditional knowledge of Inuit regarding climate change and to explore the contribution that traditional knowledge, local observations and adaptive strategies can make to scientific research on climate change in the Arctic. The project produced a summary and a full-length version of the video and seven science papers (five of which have been published in journals). The video was launched in November 2000 during the COP6 climate negotiations in The Hague. It attracted worldwide media interest that drew attention to the impacts of climate change in the Arctic. The success of the project has led to the development of follow-on initiatives to communicate the project's findings and replicate the methodology in other regions.

074 Traditional Knowledge

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Region: IN **Location:** Along the Peel River (Fort McPherson)

Peel River Ethno-Archaeological Project 2000

Two elders from Fort McPherson, three Teetl'it Gwich'in students, Ingrid Kritsch, Rita Carpenter In July 2000, the Gwich'in Social and Cultural Institute (GSCI) in partnership with the Teetl'it Gwich'in Council and the University of Alberta initiated an ethno-archaeological project aimed at finding archaeological sites in the Peel River drainage of the Yukon and Northwest Territories. The field crew consisted of an elder, young adults and youth from Fort McPherson, GSCI staff, Dr. Ray Le Blanc and Mélanie Fafard from the University of Alberta. The field work included: (1) a helicopter survey in the eastern part of the Richardson Mountains; (2) a twelve-day river survey of the Peel River between Fort McPherson in the Northwest Territories and the Caribou River in the Yukon Territory and; (3) a test excavation at a site located in Fort McPherson, where, according to the oral history, the Teetl'it Gwich'in used to camp during their annual visit to the Fort. Using the information provided by Teetl'it Gwich'in Elders about places that are named in the Peel River area and the stories associated with them, we examined close to 25 of these locales and recorded 13 new sites ranging in age from the pre-contact period to the present. These included places where only stone tools were collected, a winter camp (Vadzaih ván tshik) that has been used by the Teetl'it Gwich'in since the pre-contact period up to this day, sites where remains of cabins were identified or where material remains were found in the eroding bank and one site with a moss house (ninkahn). Finally, in all the test pits excavated in Fort McPherson, cultural remains were identified. Those mostly included European trade goods, although a bone awls and three stone artifacts were also found.

075 Traditional Knowledge

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Reference Number: 12 410 553
Region: IN **Location:** Fort McPherson, Tsiigehtchic and Inuvik

Gwich'in Knowledge of the Land

This was the second field season for the research on Gwich'in Knowledge of the Land. Two periods of fieldwork were carried out with Gwich'in collaborators. The first period was conducted in the winter with the help of William and Mary Teya. Observations on activities such as winter travel, hunting, snaring, meat processing, wood cutting and other winter activities were taken at their campsite near Road River. Extensive field-notes along with photographic and video documentation of the landscape and activities around the camp were carried out. The second period of fieldwork was during August of 2000. Time was spent berry picking along the Dempster Highway and a trip was made to Alestine Andre's fish camp at Tree River on the MacKenzie River. Again, photographs and videos were taken to document activities. Some of the first caribou returning from the calving grounds along the Dempster were also observed by chance and photographs of the landscape at that season were taken.

076 Traditional Knowledge

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Reference Number: 12 410 566
Region: SS **Location:** Lutsel K'e

The Use and Comparison of Traditional Environment Knowledge and Ecological Science in the Assessment of Barren Ground Caribou Herd Condition in Canada's Northwest Territories

This study was carried out to compare and use traditional environmental knowledge (TEK) and ecological science to look at body fat markers from harvested caribou. The TEK of hunters and elders was compared to ecological science measurements focusing on cow/calf ratio, herd productivity and prediction of animal quality. TEK was gathered from interviews of consenting individuals and body fat levels will be obtained from six scientific measurements. Caribou will only be harvested by local hunters. This research showed how TEK and ecological science can be joined to provide management options for a common resource and how aspects of the Canadian-Indigenous peoples co-management experience can potentially be applied in New Zealand.

077 Archaeology

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Reference Number: 2000-900 (PWNHC)
Region: **Location:** Fort Simpson Heritage Park

Fort Simpson Heritage Park

At the request of the Fort Simpson Historical Society, the Prince of Wales Northern Heritage Center did a brief archaeological inspection of the Fort Simpson Heritage Park. About an acre in size, the park was recently set up by the Fort Simpson Historical Society to commemorate and preserve the McPherson House, a log cabin built in 1936, and one of the oldest surviving buildings in the community. With a clear view of the point where the Mackenzie and Liard Rivers join, the park has proved popular with residents and visitors. The park development plan includes moving the Roman Catholic Rectory, built in 1911, back to its original site within the park boundary, requiring a new building foundation. However, the area has long been suspected as being the site of “Fort of Forks”, a North West Company fur trading post constructed in 1803 near the confluence of the Mackenzie and Liard Rivers. Concerned that plans might impact the remains of the fur trading post, the Society asked the Prince of Wales Northern Heritage Center to do a brief archaeological inspection of the park area. The objective of the archaeological inspection was to find out if archaeological deposits exist at the park, to find out what they are, and to let the Society know if further archaeological research is necessary. For three days, and with the assistance of Steve Rowan, a founding member of the Fort Simpson Historical Society, a power soil auger was used to test for archaeological deposits in the area of the Rectory foundation. A stratified archaeological site, with a depth of at least 2.5 meters, was found. The upper part of the soil column contained objects dating to the post-contact period and was badly disturbed. However below this 25 cm-thick layer were undisturbed, stratified cultural deposits, where a hearth, and a stone flake were noted. The Fort Simpson Historical Society hopes to do further archaeological research at the site.

078 Archaeology

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Reference Number: 2000-893 (PWNHC)
Region: **Location:** North of Lac de Gras

Archaeological Investigations Done North of Lac de Gras

Jean Bussey of Points West Heritage Consulting Ltd. directed archaeological investigations for BHP Diamonds Inc. in its claim block north of Lac de Gras. Gabriella Prager and Bonnie Campbell, also of Points West, and Nancy Casaway of the community of Lutsel k'e assisted. The field work was an archaeological inventory as well as tours for representatives of the Dogrib First Nation. Edward Camille and Francis Williah, both elders, and their interpreter, Michelle Rabesca, were involved. Numerous recorded archaeological sites were revisited during the tours. During the archaeological inventory, twelve new archaeological sites were discovered, bringing the total number of known sites in the BHP claim block to 162. Stone tools or the fragments (flakes) removed during the manufacture of stone tools characterize the twelve new sites. Most of the specimens are white or grey quartz. One site was on a lake southwest of the EKATI Diamond Mine, and two were found on an esker to the east. The other nine sites are associated with the Ursula West esker north of the mine where the majority of the field inventory was done in response to a proposed road and gravel source. Eight of these nine sites are located on the esker and one is on a small hill overlooking Ursula Lake. Three of these sites are within or near planned developments associated with a proposed gravel source and if selected, additional archaeological investigation would be required. Due to the initiation of construction for the Misery mine southeast of Ekati, five previously recorded sites located in the vicinity were visited to reassess their status. Two of these sites are near proposed development. LdNs-2 consisted of a small surface scatter that was subjected to complete collection in 1995. Because intact deposits were within the proposed right-of-way of a waterline, some additional excavation was done at LdNs-16 this summer. LdNs-16 had been sample excavated in 1997 and the artifacts recovered this year are comparable to those found during the earlier excavation. The newly collected artifacts will be analyzed during the winter.

079 Archaeology

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Reference Number: 2000-897 (PWNHC)
Region: **Location:** Western Victoria Island

Archaeological Investigation on Western Victoria Island, NWT July-August 2000

Archaeological investigations, along with geological investigations, were carried out between mid-July and mid-August on western Victoria Island, N.W.T. These investigations are the second field season of a long-term assessment of the relationship between first and later Paleoeskimo, Thule and historic Inuit occupations on southwestern Victoria Island and changing paleoenvironmental conditions. Previous studies have documented Paleoeskimo (ca. 4000-1000 B.P.) and Thule and historic Inuit sites in this area. This is a systematic attempt to look at varying intensities of prehistoric occupations, and relate these to changing environmental conditions. Field surveys were done in four areas on Prince Albert Sound: Woodward Point, Page Point, Linaluk Island region, and along the south central part of the sound. The nature and amount of data collected at each site varied according to field priorities at the time of examination. Thus, some sites were examined and recorded in considerable detail, while others were simply noted as to location, and the number and types of features estimated. No excavations were done, and items recovered from the various sites were restricted to charcoal, bone, wood and other materials suitable for dating purposes. A total of 115 sites, comprising 628 Paleoeskimo and 350 Thule/historic dwelling features, and several hundred caches, fox traps and other features, were recorded. Several of these sites had been previously reported by Robert McGhee. While the occupation of the study area spans essentially the entire temporal range of human occupation known for this region of the Arctic, our preliminary results suggest that there are definite occupation 'pulses', similar to those described elsewhere in the Canadian Arctic. Specifically, following relatively high Early-Mid Pre-Dorset population levels, there was a great decrease in occupation until Mid-Late Dorset times, at which point they increased slightly, but not attaining the Pre-Dorset levels. Early Thule occupations were generally sparse, but increase substantially toward the late prehistoric/historic transition period.

080 Archaeology

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Reference Number: 2000-894 (PWNHC)
Region: **Location:** Richardson Mountains, Peel River, Caribou River, Fort McPherson

Peel River Ethno-archaeology Project
In July 2000, the Gwich'in Social and Cultural Institute (GSCI) in partnership with the Teetl'it Gwich'in Council and the University of Alberta started an ethno-archaeological project aimed at finding archaeological sites in the Peel River drainage of the Yukon and Northwest Territories. This watershed traditionally played an important role in the life of the Teetl'it Gwich'in, with fish camps established along the Peel River during the summer and the river providing access to a vast inland area, including the Peel River Plateau, where people hunted in the winter. The field crew consisted of an elder, young adults and youth from Fort McPherson, GSCI staff, Dr. Ray Le Blanc and Mélanie Fafard from the University of Alberta. The field work included: (1) a helicopter survey in the eastern part of the Richardson Mountains; (2) a twelve-day river survey of the Peel River between Fort McPherson in the Northwest Territories and the Caribou River in the Yukon Territory and; (3) a test excavation at a site located in Fort McPherson, beside the Anglican church where, according to the oral history, the Teetl'it Gwich'in used to camp during their annual visit to the Fort in the spring. Using the information provided by Teetl'it Gwich'in Elders about places that are named in the Peel River area and the stories associated with them, we examined close to 25 of these locales and recorded 13 new sites ranging in age from the pre-contact period to the present. These included places where only stone tools were collected, a winter camp (*Vadzaih ván tshik)* that has been used by the Teetl'it Gwich'in since the pre-contact period up to this day, sites where remains of cabins were identified or where material remains were found in the eroding bank and one site with a moss house (*ninkahn).* Finally, in all the test pits excavated in Fort McPherson, cultural remains were identified. Those mostly included European trade goods, although a bone awls and three stone artifacts were also found.

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081 Archaeology
Hart, Elisa
Inuvialuit Land Administration
Box 290
Tuktoyaktuk, NT X0E 1C0

Reference Number: 2000-905 (PWNHC)
Region: **Location:** Seismic Lines and Access routes for Veritas and clients in the ISR

Veritas Reconnaissance
Elisa Hart of the Inuvialuit Land Administration accompanied a seismic reconnaissance crew working for Veritas Seismic, to locate known heritage sites on or near proposed developments related to two seismic programs. One program is for Burlington Resources Canada Energy Ltd. and the other is for AEC West Ltd. Veritas and their clients propose to maintain a 100 m buffer between known sites and developments such as seismic lines, access routes and mobile sleigh camps. Precise GPS readings were taken for each site found and those in close proximity to developments were staked.

082 Archaeology

Hart, Elisa
Inuvialuit Lands Administration
Box 290
Tuktoyaktuk, NT X0E 1C0

Reference Number: 2000-898 (PWNHC)
Region: **Location:** Kitigaaryuit (Inuvialuit Settlement Region)

Kitigaaryuit National Historic Site
Parks Canada provided funding to the Inuvialuit Social Development Program to complete the mapping of cultural remains at Kitigaaryuit National Historic Site. Kitigaaryuit was the central gathering place of the Kitigaaryumiut, who gathered there in winter for celebrations related to the disappearance and eventual return of the sun. They also gathered in summer for a collective beluga whale hunt. Among the remains at the site are a village, a Hudson's Bay Company Post, and an Anglican mission. There are also extensive graveyards, in which about 230 traditional log graves are visible on the surface. The Inuvialuit Social Development Program (ISDP) has donee research related to Kitigaaryuit since 1995. This has involved oral history and archival research along with an archaeological inventory and mapping. It has also included vegetation surveys, and preliminary assessments of the impacts of tourism, and of coastal processes threatening the site. The crew consisted of Elisa Hart, David Taylor, who operated the differential GPS, and Done Gardner. Done was invited to continue his research on Kitigaaryuit skin boats through an analysis of boat parts found at the site. Done's research has shown that the Kitigaaryuit had a unique and little understood boat building tradition. Their innovative designs attest to their knowledge of creating boats that were strong, but much lighter than found in other parts of the Arctic. We found that major impacts are occurring from erosion and the thawing of permafrost. ISDP proposes to do more research on coastal processes in the summer of 2001. Oral historical research will also continue so that we can learn more about the uses of the cultural remains at the site, and of life at Kitigaaryuit.

083 Archaeology

Head, Thomas
Bison Historical Services Ltd.
227 14 st NW
Calgary, AB T2N 1Z6

Reference Number: 2000-904 (PWNHC)
Region: **Location:** 20km north of Fort Liard

Canadian Forest Oil Ltd. Well Site and Access road Impact Assessment
On behalf of Canadian Forest Oil Ltd., Thomas Head of Bison Historical Services Ltd. undertook an Historical Resources Impact Assessment of a proposed well site and access road about 20 km northwest of Fort Liard, NT. This project was facilitated by the Acho Dene Koe First Nation. Field assistance and information on traditional land use was provided by Mr. Dolphus Codille and Mr. John Klondike Jr., both from the Acho Dene Koe First Nation. The access road is sited to avoid poorly drained areas while the well site is associated with some of the most poorly drained terrain associated with this project. Shovel testing was done as a principal site discovery technique since natural exposures were lacking. Thirty-two negative shovel tests were dug during the heritage resource impact assessment. Traditional land use studies included a discussion with Mr. Dolphus Codille and Mr. John Klondike Jr. from the Acho Dene Koe First Nation. Following completion of the wide ranging discussion, a helicopter tour of the area provided a better understanding of the verbal information given and the study area. No traditional land use sites were identified on, or immediately adjacent to, the proposed well site and access road.

084 Archaeology

Mason, Andrew
Golder Associates Ltd.
4260 Still Creek Dr.
Burnaby, BC V5C 6C6

Reference Number: 2000-901 (PWNHC)
Region: **Location:** Cameron Hills

Cameron Hills HeritageResource Impact Assessment

Paramount Resources Limited (Paramount) is proposing to drill and test nine new wells and conduct tests on seven existing wells within their significant discovery licence (SDL) area in the Cameron Hills area in the Northwest Territories (NT). Depending on the success of the wells, flowlines, a camp, an airstrip, bridges, a satellite and a battery would be constructed within the NT. In addition, a pipeline would be constructed to the south, into Alberta, to tie-in to a proposed pipeline from Paramount's Bistcho Plant to a point just south of the Alberta/NT border. Another option, a pipeline that ran south-east from the battery to a point located along the highway north of Indian Cabins, Alberta was also assessed. This expansion of the present Paramount oil and gas development is referred to as the Cameron Hills Project (the Project). Andrew Mason of Golder Associates Ltd. (Golder) carried out a heritage resources impact assessment (HRIA) as part of the Environmental Screening for the proposed development. The HRIA fulfills the requirements of the Mackenzie Valley Resource Management Act as required by the Oil and Gas Directorate of Indian and Northern Affairs Canada and the National Energy Board. HRIA was completed by Golder between July 31 and September 17. The Alberta portion of the study was completed under Alberta Archaeological Research Permit #2000-123.The entire development area was flown by helicopter many times with Elders and other representatives from local First Nations communities to document traditional ecological knowledge the Elders may have concerning the study area and to identify areas of moderate or high archaeological potential. Areas noted by Elders or areas of assessed moderate to high archaeological potential were subjected to more detailed field inspections. A number of low potential areas were also examined and shovel tested to confirm the assessed archaeological potential. Much of the study area was found to have low archaeological potential given its generally wet and low-lying conditions. Crossings on the Cameron River and other elevated, well-drained areas exhibited the greatest archaeological potential, but shovel tests and the examination of existing exposures did not reveal archaeological materials. No heritage resources were identified during the HRIA. No further archaeological work was recommended for the Paramount Cameron Hills development as presently proposed.

085 Archaeology

Ronaghn, Brian
Golder Associates Ltd.
10th Floor, 940 -6th Ave. SW
Calgary, AB T2P 3T1

Reference Number: 2000-899 (PWNHC)
Region: **Location:** Ochre River

Mackenzie Valley Winter Road Ochre River Bridge Project for GNWT Department of Transportation
The GNWT Department of Transportation plans to upgrade a portion of the existing Mackenzie Valley winter road by building a new bridge at the Ochre River crossing north of Wrigley. This project will improve winter access and will assist in controlling erosion after spring-melt. In June 2000, Brian Ronaghan of Golder Associates examined construction zones for historical resource concerns associated with this development. The project also included participation by an elder of the Pehdzeh Ki Dene Community, Edward Hardisty, who accompanied the archaeologist and representatives of Transportation during the field inspection to advise about any concerns there might be for sites and areas that the community would consider important. Although several archaeological and traditional use sites had been recorded in studies that took place before the road was built, all of these occur outside areas proposed for bridge construction. The project involved inspection of the proposed development zones, some of which had been cleared by hand in the winter, and testing of areas that might contain buried artifacts. Mr. Hardisty confirmed that no cabins or other sensitive areas would be affected, and no new archaeological or traditional sites were found during the inspection. It was recommended that the Department of Transportation be granted approval to build the new approach and bridge crossing at the Ochre River.

086 Archaeology

Stevenson, Marc
North Slave Metis Association
Box 340
Yellowknife, NT X1A 2N3

Reference Number: 2000-902 (PWNHC)
Region: **Location:** Old Fort Rae, North Arm of Great Slave Lake

Archaeological Investigations of Old Fort Rae's "Old Fort", August 2000

In 1892, during his stay at Old Fort Rae on the North Arm of Great Slave Lake, the explorer/adventurer Frank Russell observed that: “Two hundred yards from the big house (i.e., the Hudson’s Bay Company main post building) on the shore of a little cove called Sandy Bay, a few crumbling ruins of clay and stone chimneys mark the site of an ‘old fort,’ abandoned so long ago that nothing is known by the present inhabitants concerning it.” With this information in hand, these ruins were re-discovered in June, 2000, by Clem Paul of the North Slave Metis Alliance. Removal of the moss from this feature and an adjacent rock mound confirmed these were remains of an “old fort”, and most probably the one identified by Russell. Plans were then made to conduct a preliminary archaeological assessment of these remains in August 2000. Students of Great Slave Lake history generally accept the arrival of the Hudson’s Bay Company in 1852 as the date when Metis first settled at Old Fort Rae. However, there are a number of lines of evidence to suggest that Old Fort Rae, or Mountain Island as it was known prior to the establishment of the Hudson’s Bay Company (HBC) post, was occupied by Metis as much as half a century or more earlier. This evidence led to the consideration of four possible explanations for “old fort” remains. In addition to the two-room dwelling (Feature A) that was the focus of investigations in August 2000, an additional half dozen features were recorded including the remains of another well defined dwelling with fireplace and adjacent interior cellar. Excavation of approximately 10 square metres in Feature A recovered about 50 artifacts and 3 kg of broken and burnt caribou, fish and unidentifiable bone. With the preliminary nature of the archaeological investigations done and the small size of the artifact sample obtained , none of the four hypotheses can be rejected at this time. The occurrence of trade silver, wire wound barrel as opposed to tubular drawn beads, and hand-wrought nails as opposed to machine cut nails tends to support an earlier (pre-1800) rather than later (post-1800) occupation. In light of the archaeological and historic evidence, the most reasonable conclusion, that can be drawn about Old Fort Rae’s “old fort” at this point in time is that, it is either 1) a pre-1780 occupation of early Metis formerly associated with the Company of the Sioux, or 2) a late-1780s/early 1790s occupation of Metis associated with NWC trading activity on the North Arm. Although the evidence tends to favour the former interpretation, only subsequent archaeological and historical investigations will confirm which hypothesis, if either, is correct. Subsequent investigations of Old Fort Rae’s “old fort” will necessitate a rewrite of the history of the early fur trade on the North Arm and of Metis use and occupation of Great Slave.

087 Archaeology

Thompson, Callum
Jacques Whitford Environment Ltd.
Ste. 500, 703 - 6th Ave. SW
Calgary, AB T2P 0T9

Reference Number: 2000-895 (PWNHC)
Region: **Location:** Gahcho Koe, Snap Lake

Archaeological Investigations on Winter Access Routes to Gahcho Koe and Snap Lake Mineral Exploration Areas, District of Mackenzie, for De Beers Canada Exploration Inc.
Callum Thomson was joined by Lawrence Catholique, Lawrence Goulet and Alfred Baillargeon did two brief archaeological surveys on behalf of De Beers Canada Exploration Inc. The first survey in August focused on sites recorded in 1999 on the 120 km winter access route from MacKay Lake to the De Beers mineral exploration property at Gahcho Kué (Kennady Lake), via Reid, Munn, Margaret and Murdock lakes. Where sites had been found on the access route and at proposed road construction camps in 1999, alternate routes and camp locations that would avoid these sites were found, assessed and mapped. An additional 48 sites were found to add to 50 found in 1999, mostly from the pre-contact period. At Gacho Kué, surveys in the Doyle Lake exploration area and 12 km winter access route south of the De Beers camp resulted in the finding of two new sites, and another site was found on an esker while obtaining GPS coordinates for the 45 sites found around Gahcho Kué in 1999. The survey finished with a helicopter flyover of a 100 km route that De Beers was considering for use as an alternate means of accessing Gahcho Kué, starting at the Lupin Ice Road south of Warburton Bay on MacKay Lake and going south to the former Winspear development at Snap Lake and east via Lac Capot Blanc to Munn Lake to join the original De Beers route. Several hundred areas and locations of archaeological potential were noted on and near the route during the flyover. Visits to four of these locations confirmed the aerial predictions: seventeen sites were found. In September, a visit was made to do a more detailed survey of portages on the alternate route via Snap Lake, and an additional 48 sites were found on and near the route and at nearby eskers that have some potential for use as borrow areas. Four new sites were found on a proposed approach route to a road construction camp on the original route south of Back Lake. Six new sites were located during a more extensive survey around the Doyle Lake exploration area south of the De Beers Gahcho Kué camp. Snow on the last night of the survey put a sudden end to the work. During the two surveys, 126 new sites were found. Most of the precontact period sites were located on elevated knolls and terraces, or on and beside eskers, close to water, where a good view could be obtained of caribou approaching or crossing nearby lake narrows. Most of the sites contained a scatter of a few to as many as several hundred white quartz – sometimes grey or pink – cores, tools, flakes and chunks from the process of quarrying, reducing, manufacturing or modifying stone tools, and some contained tent rings and hearths. A few quartz boulders and bedrock veins were found where raw material for tool making had been quarried. One site had two stone adze blades and a stemmed point, possibly from an occupation several thousand years ago, but most of the pre-contact sites probably date within the past 2,500 years. The few artifacts that were collected for analysis will be returned to the Prince of Wales Northern Heritage Center. Sites from the more recent traditional use period contain tent rings, hearths, boulder markers, axe-cut trees, firewood, wooden floats from a net, and two fragmentary wooden bows, suggestive of caribou hunting, fishing and possibly trapping during the past two centuries or so. The large number and density of sites found over the past two years indicates that surveys of winter access routes are a necessary form of impact assessment, and a productive source of knowledge. De Beers is committed to heritage conservation and will, wherever possible, modify access route alignments, camp locations, and exploration plans to avoid disturbance of this evidence of several thousand years of occupation of this region. Where avoidance is not possible, sites will be fully documented and appropriate mitigation recommendations will be submitted to the regulator for approval.

Department of Resources, Wildlife & Economic Development
Wildlife Research Permits

088 Wildlife
Arey, Dennis
Aklavik Hunters and Trappers Committee
PO Box 133
Aklavik, NT X0E 0A0

Reference Number: 2107
Region: IN **Location:** Aklavik Area

Muskoxen Harvest Study
Species studied: Muskoxen
The objective of the study was to examine 5 muskoxen of either sex from the Aklavik area for parasite and disease incidence

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089 Wildlife
Benn, Bryon
Gwich'in Renewable Resource Board
PO Box 2240
Inuvik, NT X0E 0T0

Reference Number: 2778
Region: IN **Location:** Fort McPherson Area

Moose Abundance and Composition in the Ft. McPherson Area
Species studied: Moose
The objective of the study was to assess moose abundance and composition in the Ft. McPherson area.

090 Wildlife

Benn, Bryon
Gwich'in Renewable Resource Board
PO Box 2240
Inuvik, NT X0E 0T0

Reference Number: 2781
Region: IN **Location:** Near the headwaters of the Arctic Red River in the NWT

Woodland Caribou in the Arctic Red River Headwaters Region of the Gwich'in Settlement Area.
Species studied: Woodland caribou
The objective of the study was to assess the fall movements of caribou in the Arctic Red River headwaters region of the Gwich'in Settlement Area, NWT.

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091 Wildlife

Boucher, Maurice
Fort Resolution Environmental Working Committee
PO 1899
Fort Resolution, NT X0E 0M0

Reference Number: 2752
Region: SS **Location:** Slave River delta

Contaminant Levels in Beaver from the Slave River Delta
Species studied: Beaver

The objective of the study was to assess contaminant levels in beaver from the Slave River Delta

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092 Wildlife

Branigan, Marsha
Resources, Wildlife and Economic Development
Bag Service #1
Inuvik, NT X0E 0T0

Reference Number: 2121
Region: NS **Location:** Winspear Resources Snap Lake project area

Baseline Environmental Snap Lake
Species studied: Various wildlife and bird species
The objective of the study was to conduct environmental baseline work on wildlife in the Winspear Resources Snap Lake project area.

093 Wildlife

Branigan, Marsha
Resources, Wildlife and Economic Development
Bag Service #1
Inuvik, NT X0E 0T0

Reference Number: 2763
Region: IN **Location:** Richardson Mountains in the NWT and Yukon

Grizzly Bear Reproductive Rates and Cub Survival in the Richardson Mountains, NT and YT.
Species studied: Grizzly bears
The objective of the study was to assess grizzly bear reproductive rates and cub survival.

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094 Wildlife

Brook, Rodney
Canadian Wildlife Services
Suite 301 5204-50th Ave.
Yellowknife, NT X1A 1E3

Reference Number: 413
Region: various **Location:** Various locations in the NWT

Import Lesser ScaupStudy
Species studied: Lesser scaup
The research team imported lesser scaup for use as decoys for the capture of wild birds of the same species. The imported birds were killed or exported at the end of the project.

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095 Wildlife

Carrière, Suzanne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2765
Region: various **Location:** Various locations in the NWT

Hare Monitoring by Faeces Transects
Species studied: Snowshoe hare
The objective of the study was to continue research on snowshoe hare in the various NWT locations.

096 Wildlife

Carrière, Suzanne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2776
Region: various **Location:** Various locations of the NWT

NWT Small Mammal Survey
Species studied: Small mammals
The objective of the study was to continue research on small mammals.

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097 Wildlife

Carrière, Suzanne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2768
Region: IN, SA, DC **Location:** Mackenzie Valley

Five-year Peregrine Falcon Survey - Mackenzie Valley 2000
Species studied: Peregrine Falcon
The study was completed as part of an on-going 5 year peregrine falcon survey.

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098 Wildlife

Carrière, Suzanne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2761
Region: NS **Location:** Taiga Shield Watershed

Multi-disciplinary Study of Post-Fire Effects on a Taiga Shield Watershed
Species studied: Various wildlife and bird species
The objective of the study was to a conduct a 'multi- disciplinary' study of post fire effects.

099 Wildlife

Cluff, Dean
Resources, Wildlife and Economic Development
PO Box 2668
Yellowknife, NT X1A 2P9

Reference Number: 2108
Region: NS **Location:** Slave Geological Province in the NWT

Study Wolf Population Study
Species studied: Wolves
The genetic relationships between NWT wolf populations was examined, and related to existing movement and mortality information.

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100 Wildlife

Dickson, Lynne
Canadian Wildlife Services
Room 200 4999 98th Ave
Edmonton, AB T6B 2X3

Reference Number: 2762
Region: IN **Location:** Banks Island

Use of Satellite Telemetry to Locate the Moulting and Wintering Areas of King Eiders on Banks Island
Species studied: King eiders
The objective of the study was to locate the moulting and wintering areas of king eiders that nest on Banks Island by use of satellite telemetry.

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101 Wildlife

Elkin, Brett
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2113
Region: IN, SA Location: Beverly herd range

Beverly Caribou Herd Sampling Program
Species studied: Caribou
The objective of the study was to collect biological samples from 30 hunter killed caribou from the Beverly Caribou Herd for the determination of heavy metal and radionuclide contaminant levels.

102 Wildlife

Elkin, Brett
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2112
Region: various **Location:** throughout the NWT

NWT Wildlife Health Monitoring Program
Species studied: Various species
The objective of the study was to monitor wildlife health through the NWT through the collection and analysis of samples from sick or dead wildlife.

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103 Wildlife

Fehr, Alan
Parks Canada
Western Arctic Field Unit
PO Box 1840
Inuvik, NT X0E 0T0

Reference Number: 2754
Region: IN **Location:** Tuktut Nogait National Park

2000 Canadian Peregrine Falcon Survey - Tuktut Nogait National Park
Species studied: Peregrine falcon
The objective of the study was to participate in the 2000 Canadian peregrine falcon survey.

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104 Wildlife

Goldsberry, J.
US Fish and Wildlife Service
11500 American Holly Drive
Henshaw Building
Laurel, MD 20708-4016

Reference Number: 2777
Region: SA **Location:** Mills Lake

Western Canada Cooperative Waterfowl Banding Program. - Mills Lake Station
Species studied: Various waterfowl species
The objective of the study was to continue banding activities under the Western Canada Cooperative Waterfowl Banding Program.

105 Wildlife

Gunn, Anne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2109
Region: NS **Location:** South Great Bear Lake, NWT

South Great Bear Lake Caribou Study
Species studied: Caribou
The study was a continuation of the South Great Bear Lake caribou movement study. Collars from 4 cows in March or April, and biological specimens were collected from the collared animals to assess herd health.

106 Wildlife

Gunn, Anne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2116
Region: DC **Location:** Selwyn-Logan-Mackenzie Mountain Area

South Nahanni Mountain Caribou Herd Study
Species studied: Caribou
The objective of the study was to examine the South Nahanni Mountain caribou herd and to capture and satellite collar up to 5 caribou cows

107 Wildlife

Gunn, Anne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2077
Region: IN, SA Location:

Bathurst Caribou Herd Study
Species studied: Caribou
The objective of the study was to examine the Bathurst caribou herd.

108 Wildlife

Gunn, Anne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2772
Region: SA **Location:** Beaverhill Lake Area

Beaverhill Lake Muskox Survey
Species studied: Muskoxen
The objective of the study was to determine the abundance and distribution of muskox in the Beaverhill Lake area.

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109 Wildlife

Gunn, Anne
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2767
Region: IN, SA Location: Bathurst caribou herd location

Movement of female caribou of the Bathurst Herd
Species studied: Barren-Ground caribou
The objective of the study was to continue to monitor the movement of female caribou from the Bathurst herd fitted with satellite collars.

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110 Wildlife

Hazsard, Shannon
Gwich'in Renewable Resource Board
PO 2240
Inuvik, NT X0E 0T0

Reference Number: 2756
Region: IN **Location:** Gwich'in Settlement Areas

Breeding Waterfowl in the Gwich'in Settlement Area
Species studied: Waterfowl
The objective of the study was to assess breeding biology and habitat of white-winged scoters, surf scoters, lesser and greater scaup.

111 Wildlife

Hines, James
Canadian Wildlife Services
Suite 301 5204-50th Ave.
Yellowknife, NT X1A 1E3

Reference Number: 2753
Region: various **Location:** various locations throughout the NWT

Waterfowl Productivity Assessment
Species studied: various waterfowl species
The objective of the study was to assess the abundance and productivity of waterfowl and other aquatic birds breeding in the boreal forest

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112 Wildlife

Hines, James
Canadian Wildlife Services
Canadian Wildlife Services
Suite 301 5204-50th Ave.
Yellowknife, NT X1A 1E3

Reference Number: 2764
Region: IN **Location:** Inuvialuit Settlement Region

Snow Goose Population and Habitat Studies in the Inuvialuit Settlement Regions
Species studied: Snow Goose
The objective of the study was to assess lesser snow goose populations and habitat in the Inuvialuit Settlement Region of the NWT.

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113 Wildlife

Hines, James
Canadian Wildlife Services
Suite 301 5204-50th Ave.
Yellowknife, NT X1A 1E3

Reference Number: 2773
Region: IN **Location:** Western High Arctic.- Prince Patrick and Melville islands

Status, Demography and Winter Habitat Use of Gray-bellied Brant
Species studied: Brant
The objective of the study was to determine the status, demography and winter habitat use of gray-bellied brant

114 Wildlife

Hudon, Jocelyn
Provincial Museum of Alberta
12845 102 Ave.
Edmonton, AB T5N 0M6

Reference Number: 2751
Region: SS **Location:** Mainly southern region of NWT and Alberta\NWT Area

Western Tanager Research
Species studied: Western tanager
The objective of the study was to conduct research on colour variation, breeding timetable and genetic variability of the western tanager in the NWT.

115 Wildlife

Irwin, Jason
University of Miami
Department of Psychology
212 Pearson Hall
Oxford, OH 45056

Reference Number: 2775
Region: various **Location:** Various locations of the NWT

Evolution and Biogeography of the Wood Frog, *Rana sylvatica*
Species studied: Wood frog
The objective of the study was to examine the evolution and biogeoraphy of the wood frog.

116 Wildlife

Johnstone, Robin
Golder Associates Ltd.
Postal Service 9600
PO Box 255
Yellowknife, NT X1A 2R3

Reference Number: 2120
Region: IN **Location:** Amundsen Gulf Area

Polar Bear Research in the Amundsen Gulf.
Species studied: Polar bear
The objective of the study was to capture, ear tag, tattoo and obtain blood, pre-molar teeth, ear punch plugs and fat samples from up to 40 polar bears in the course of population decline

117 Wildlife

Joly, Damien
University of Saskatchewan
Saskatoon, SK

Reference Number: 2114
Region: SS **Location:** Wood Buffalo National Park

Wood Buffalo National Park Bison Study
Species studied: Bison
The objective of the study was to capture and remove collars from bison collared in Wood Buffalo National Park that have moved into the NWT.

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118 Wildlife

Kershaw, Peter
University of Alberta
Edmonton, AB T6G 2E3

Reference Number: 2780
Region: SA **Location:** SEEDS site near Tulita

Studies of the Environmental Effects of Disturbances in the Subarctic - SEEDS
Species studied: Various wildlife and bird species
The objective of the study was to continue the small mammals survey and recapture study at the site.

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119 Wildlife

Koch, Iris
Royal Military College - Environmental Sciences Group
PO Box 17000
Station Forces
Kingston, ON K7K 7B4

Reference Number: 2782
Region: NS **Location:** Yellowknife Area

Bioavailability of Arsenic in Yellowknife
Species studied: Small mammals and forest birds
The objective of the study was to assess the bioavailability of arsenic in the area of Yellowknife, NWT.

120 Wildlife

Latour, Paul
Canadian Wildlife Services
Suite 301 5204-50th Ave.
Yellowknife. NT X1A 1E2

Reference Number: 2759
Region: DC **Location:** Liard Valley Area

Distribution and Abundance of Songbirds in Relation to Forest Cover Type in the Liard Valley
Species studied: Songbirds
The objective of the study was to assess the distribution and abundance of songbirds in relation to forest cover type.

121 Wildlife

Lyver, Philip
National Resources Institute
University of Manitoba
Winnipeg, MB R3T 2N2

Reference Number: 2786
Region: SS **Location:** Lutsel K'e region

Use of TEK and Ecological Science in the Assessment of Barrenground Caribou Herd Condition in the NWT.
Species studied: Barren-ground caribou
The objective of the study was to monitor caribou body conditions with the help of Elders.

122 Wildlife

MacDonald, Bruce
Ducks Unlimited Canada
5017-52nd St.
Yellowknife, NT X1A 1T5

Reference Number: 2755
Region: SA **Location:** Tulita Landsat TM Image in the Sahtu Settlement Region of NWT

Land-Cover Inventory and Waterbird Ecology of Wetland for the Tulita Landsat TM image in the Sahtu Settlement Region of the Northwest Territories
Species studied: Aquatic birds
The objective of the study was to assess land-cover inventory and waterbird ecology of wetland habitats in the Sahtu Settlement Region of the Northwest Territories.

123 Wildlife

Madsen, Eric
Diavik Diamond Mines Inc.
PO Box 2498
Suite 205 5007 50th Ave.
Yellowknife, NT X1A 2P8

Reference Number: 2123
Region: NS **Location:** Diavik Diamond Mine Project Area

Wildlife\Birds Monitoring at Diavik
Species studied: Various wildlife and bird species
The objective of the study was to monitor caribou, carnivores, small mammals and birds at the Diavik Mine site.

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124 Wildlife

Mears, Margaret
Western Oilfield Environmental Services Limited
110 550-6th Ave SW
Calgary, AB T2P 0S2

Reference Number: 2770
Region: DC **Location:** Cameron Hills Area

Wildlife and Habitat Survey for Paramount Resources' Exploration, Drilling and Production Project in the Cameron Hills Area
Species studied: Various wildlife and bird species
The study was completed as part of a wildlife and habitat survey in the area of Paramount Resources' exploration, drilling and production project in the Cameron Hills.

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125 Wildlife

Melton, Derek
Golder Associates Ltd.
10th Floor 940-6th Ave SW
Calgary, AB T2P 3T1

Reference Number: 2785
Region: IN **Location:** Gwich'in Area in the NWT

Environmental Assessment for the Proposed Oil and Gas Development Activities in the Gwich'in Settlement Area
Species studied: Various wildlife and bird species
The study was completed as part of an environmental assessment for proposed oil and gas development activities in the area.

126 Wildlife

Moore, Steve
RESCAN
Suite 908 5201-50th Ave
Yellowknife, NT X1A 3S9

Reference Number: 2784
Region: SA **Location:** Taltson River and Nonacho Lake areas

Aerial Beaver Survey in the Taltson River and Nonacho Lake Areas
Species studied: Beaver
The study was completed as part of an aerial beaver survey.

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127 Wildlife

Moore, Steve
RESCAN
Suite 908 5201-50th Ave
Yellowknife, NT X1A 3S9

Reference Number: 2769
Region: SA **Location:** Edacho Peninsula (Scented Grass Hills)

Preliminary Reconnaissance of Wildlife and Vegetation of the Proposed Sahyoue/Edacho National Historic Park, Edacho Portion, Great Bear Lake, NWT
Species studied: Various wildlife and bird species
The objective of the study was to gather information on wildlife and vegetation in the area.

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128 Wildlife

Mulders, Robert
Resources, Wildlife and Economic Development
Wildlife and Fisheries Division, GNWT
5th Floor-600 5102 50th Ave.
Yellowknife, NT X1A 3S8

Reference Number: 2788
Region: DC **Location:** Fort Resolution area

Marten Harvest Study in the Vicinity of Fort Resolution.
Species studied: Marten
The objective of the study was to examine and assess the present marten harvest in the vicinity of Ft. Resolution, NWT.

129 Wildlife

Nagy, John
Resources, Wildlife and Economic Development
Bag Service #1
Inuvik, NT X0E 0T0

Reference Number: 2771
Region: IN **Location:** High Arctic

Peary Caribou and Muskox Classification surveys, High Arctic Islands
Species studied: Caribou
The objective of the study was to assess the Peary caribou and muskox populations in the High Arctic Islands.

---

130 Wildlife

Nagy, John
Resources, Wildlife and Economic Development
Bag Service #1
Inuvik, NT X0E 0T0

Reference Number: 2117
Region: IN, SA Location: Tuktoyaktuk and Colville Lake

Cape Bathurst\Bluenose West Caribou Study
Species studied: Caribou
The objective of the study was to net and radio collar up to 50 Cape Bathurst and Bluenose-West caribou in preparation for a post-calving photo-census.

---

131 Wildlife

Nagy/Larter,
Resources, Wildlife and Economic Development
Bag Service #1
Inuvik, NT X0E 0T0

Reference Number: 2122
Region: IN **Location:** NW Victoria Island

Net & Collar Peary Caribou (5)
Species studied: Caribou
The objective of the study was to net and radio collar up to 5 Peary caribou for range use and productivity studies.

132 Wildlife

Nishi, John
Resources, Wildlife and Economic Development
PO Box 390
Fort Smith, NT X0E 0P0

Reference Number: 2115
Region: SS **Location:** Mackenzie bison area

Mackenzie Bison Herd Monitoring Study
Species studied: Bison
The Mackenzie bison herd was counted and examined, to monitor and test the herd and their habitat for the presence of disease.

---

133 Wildlife

Nishi, John
Resources, Wildlife and Economic Development
PO Box 390
Fort Smith, NT X0E 0P0

Reference Number: 2110
Region: SS **Location:** Hook Lake Area

Hook Lake Bison Study
Species studied: Bison
Disease testing, herd propagation and maintenance of the Hook Lake bison restoration herd was continued.

---

134 Wildlife

Nishi, John
Resources, Wildlife and Economic Development
PO Box 390
Fort Smith, NT X0E 0P0

Reference Number: 2111
Region: SS **Location:** Slave River Lowlands

Slave River Lowland Bison Study
Species studied: Bison
The objective of the study was to count and classify Slave River Lowlands bison.

135 Wildlife

Nishi, John
Resources, Wildlife and Economic Development
PO Box 390
Fort Smith, NT X0E 0P0

Reference Number: 2774
Region: SS **Location:** Slave River lowlands

Comparative Evaluation of Genetic Diversity and Baseline Health of Free-Ranging Bison in the Slave River Lowlands
Species studied: Wood bison
The objective of the study was to compare and evaluate the genetic diversity and health of free-ranging bison.

136 Wildlife

Olson, Benn
Sahtu Renewable Resource Board
PO Box 134
Tulita, NT X0E 0K0

Reference Number: 2783
Region: SA **Location:** Mackenzie Mountains

Woodland Caribou in the Mackenzie Mountains, NWT - Initial studies
Species studied: Woodland caribou
The objective of the study was to begin initial studies of woodland caribou in the area, as part of an on-going project.

137 Wildlife

Prendergast, B.
John Hopkins University
225 Ames Hall
Baltimore, MD 21218

Reference Number: 2124
Region: various **Location:** at the John Hopkins University

Female Deer Mice Research
Species studied: Deer mouse
The objective of the study was to study was completed t o live trap & maintain in captivity up to 20 male and 20 female deer mice prior to their export from NWT to Maryland.

138 Wildlife

Stephens, Glen
Department of Indian Affairs and Northern Development
Box 1500
Yellowknife. NT X1A 2R3

Reference Number: 2758
Region: IN **Location:** Aklavik region

Contaminant Levels in Grizzly Bears from the Aklavik Area
Species studied: Grizzly bears
The objective of the study was to assess contaminant levels in grizzly bears in the Aklavik area of the NWT.

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139 Wildlife

Veitch,, Alasdair
Resources, Wildlife and Economic Development
PO Box 130
Norman Wells, NT X0E 0V0

Reference Number: 2757
Region: SA **Location:** Willow Lake in the Sahtu Settlement Area

Western Canada Cooperative Duck Banding Program at Willow Lake, Sahtu Settlement Area, NWT - 2000 Waterfowl
Species studied: Various waterfowl
The study was completed as part of the Western Canada Duck Banding Program.

---

140 Wildlife

Veitch, Alasdair
Resources, Wildlife and Economic Development
PO Box 130
Norman Wells, NT X0E 0V0

Reference Number: 2792
Region: SA **Location:** Norman Wells

Moose Survey – Norman Wells area
Species studied: Moose
The objective of the study was to complete a moose survey in the Norman Wells area.

141 Wildlife

Voelzer, J.
US Fish and Wildlife Service
Office of Migratory Bird Management
911 NE - 11th Ave Rm 125
Portland, OR 97232-4181

Reference Number: 2125
Region: IN **Location:** Mackenzie River drainage area of the NT.

Waterfowl Mackenzie River Drainage
Species studied: Waterfowl
The objective of the study was to conduct aerial surveys of the waterfowl.

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142 Wildlife

Ward, Richard
Yukon Government
PO Box 2703
Whitehorse, YT Y1A 2C6

Reference Number: 2118
Region: IN **Location:** North Slope Richardson Mountains & Yukon Coastal Plain

Moose Abundance Survey
Species studied: Moose
The objective of the study was to survey moose abundance, composition and distribution

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143 Wildlife

Warner, Keith
Canadian Wildlife Services
115 Perimeter Rd.
Saskatoon, SK S7N 2E5

Reference Number: 2766
Region: IN **Location:** Banks Island # 1 Bird Sanctuary, the Anderson River and the Kendall Island Bird Sanctuary

Snow Goose Population on Banks Island
Species studied: Snow goose
The objective of the study was to carry out a study estimating the population of lesser snow geese at a variety of bird sanctuaries in the NWT.

144 Wildlife

Williams, Scott
BHP Diamonds Inc.
#1102-4920-52nd St
Yellowknife, NT X1A 3T1

Reference Number: 2119
Region: NS **Location:** Ekati Mine Area

Monition Wildlife & Birds at Ekati Site
Species studied: Various wildlife and bird species
The objective of the study was to monitor caribou, grizzly bears, furbearers and birds on the Ekati Mine site.

145 Wildlife

Yates, Brian
Monopros
204 4905-48th
Yellowknife, NT X1A 2P8

Reference Number: 2779
Region: NS **Location:** Kennady Lake / Gahcho Kué

Waterfowl and Shorebird Surveys
Species studied: Various waterfowl species
The objective of the study was to assess waterfowl and shorebird populations in Kennady Lake, NWT.

Department of Fisheries and Oceans
Fisheries Scientific Licences

146 Fisheries

Cott, Peter
Department of Fisheries and Oceans
Suite 101 Diamond Plaza
Yellowknife, NT X1A 1E2

Reference No: SLI-00/01-229 (DFO)
Location: Yellowknife Bay (62 22'N', 114 20'W)

Baseline Survey-Yellowknife Bay
The researcher conducted baseline studies and determination of spawning sites of fish species in areas where potential for construction and development exists.

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147 Fisheries

Harwood, Lois
Department of Fisheries and Oceans
Box 1871
Inuvik, NT X0E 0T0

Reference No: SLI-00/01-214 (DFO)
Location: Safety Channel, near the community of Holman (70 30' N; 117 15' W)

Ring Seal Study-Safety Channel, near Holman
The study : (1) documented the range and movement of ring seals in the Safety Channel Area; (2) examined the depth and duration of ringed seal dives, haul out cycles, and time spent at the surface; and (3) examined their distribution and movements in relation to ice conditions and oceanographic features

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148 Fisheries

Low, George
Department of Fisheries and Oceans
42043 Mackenzie Highway
Hay River, NT X0E 0R9

Reference No: SLI-00/01-206 (DFO)
Location: GSL I East Buffalo River Closed Area

Inconnu survey-Buffalo River
The study surveyed fish stocks in the Buffalo River closed area. Data was collected on species composition, size and age, to monitor on-going efforts to rebuild the stock of inconnu in an area that was previously over-fished.

149 Fisheries

Low, George
Department of Fisheries and Oceans
42043 Mackenzie Highway
Hay River, NT X0E 0R9

Reference No: SLI-00/01-208 (DFO)
Location: NWT water bodies south of 67th Parallel

Bull trout survey-Mackenzie River Basin
The study surveyed changes to Bull Trout distribution in the Mackenzie River Basin. Data was collected on species abundance, size and age.

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150 Fisheries

Low, George
Department of Fisheries and Oceans
42043 Mackenzie Highway
Hay River, NT X0E 0R9

Reference No: SLI-00/01-209 (DFO)
Location: The Slave River, from the Rapids of the Drowned (Ft. Smith area) to the Salt River (61 18' N; 113 39' W)

Fish Population Assessment-Slave River
The fish population in the Slave River was assessed by examining fish species, abundance, size, diet and age in the Slave River, from the Rapids of the Drowned (Ft. Smith area) to the Salt River.

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151 Fisheries

Low, George
Department of Fisheries and Oceans
42043 Mackenzie Highway
Hay River, NT X0E 0T0

Reference No: SLI-00/01-210 (DFO)
Location: Slave River Delta

Fish Population Assessment-Slave River Delta
The fish population in the Slave River was assessed by examining fish species, abundance, size, diet and age in the Slave River Delta.

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152 Fisheries

Low, George
Department of Fisheries and Oceans
42043 Mackenzie Highway
Hay River, NT X0E

Reference No: SLI-00/01-216 (DFO)
Location: Kakisa Lake (60 56' N; 117 43' W)

Survey of Fish Stocks on Kakisa Lake
Fish stocks on Kakisa Lake were surveyed by collecting data on species composition, abundance, size and age.

153 Fisheries

Stephenson, Sam
Department of Fisheries and Oceans
Box 1871
Inuvik, NT X0E 0T0

Reference No: SLI-00/01-207 (DFO)
Location: NWT water bodies south of 67th Parallel

Fish distribution in the Mackenzie River Basin
The study surveyed changes to fish distribution in the Mackenzie River Basin. Data was collected on fish species presence, abundance, size and age.

154 Fisheries

Stephenson, Sam
Department of Fisheries and Oceans
Box 1871
Inuvik, NT X0E 0T0

Reference No: SLI-00/01-226 (DFO)
Location: Vittrekwa River (67 10' N; 135 01' W)

Survey of fish species in the Vittrekwa River
The distribution and abundance of various fish species within the Vittrekwa River system was determined. As well, data on fish abundance, size and age was collected, and genetic material sampled for later analysis.

155 Fisheries

Stephenson, Sam
Department of Fisheries and Oceans
Box 1871
Inuvik, NT X0E 0T0

Reference No: SLI-00/01-226 (DFO)
Location: Peel River (67 42' N; 134 32' W)

Survey of fish species in the Peel River
The spawning areas, re-distribution and stock delineation/segregation of various fish species within the Peel River system was determined, using floy tagging.

Researchers Index 2000

Aurora Research Institute
Science Licences

001 Alexander, Martin
065 Alford, Brian
002 Anderson, David
073 Ashford, Graham
003 Ballantyne, James
066 Beddoes, Colin
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004 Boxhall, Peter
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033 Whitney, Candace

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085 Ronaghn, Brian
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088 Arey, Dennis
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091 Boucher, Maurice
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Glossary of Scientific Terms

Active layer	the area where the soil freezes and thaws above the permafrost
Aeration	pumping air into a medium
Aeromagnetic survey	surveys from aircraft that make use of the magnetic field caused by magnetized rocks in the Earth's crust to make estimates about underlying geology of a given area such as distribution of potential resources
Algae	simple living things that are composed of one or more cells. Most algae are similar to plants that do not have roots or flowers
Alkali	a strong basic substance in chemistry
Analytical	a detailed examination of the structure or some other parameter of a substance or thing
Anatomy	the science that deals with body structures of animals or plants
Anoxic	a situation where oxygen is present in very low amounts or not at all
Anthropogenic	the study of the origin of man
Anthropometric	measurements of the body
Anticline	a folded upward rock that has a center that contains stratigraphically older rocks
Aquatic Biota	all living organisms in the aquatic environment
Archival	pertaining to a collection of documents
Arsenic	a chemical element that is gray in colour and that is highly poisonous with no taste
Artifacts	an old tool, weapon or other human-made thing from the past
Asexual	an organism that reproduces without the aid of a partner and who passes on all of its genetic information
Asphodel	a herb like plant
Assessed	from observations, estimated result(s) of the outcome are made
Attributed	giving an affect or outcome a cause
Aufies	ever-thickening sheets of ice formed by springs that freeze in layers 2 - 5 meters thick over existing river ice, often breaking away to become navigational hazards

Autecology	the branch of ecology that deals with the biological relationship between an individual organism or an individual species and its environment
Awl	a tool that is pointed for poking holes in leather or wood
Bacteria	tiny living single cells that can only be seen through a microscope
Baseline	the standard
Benthic	organisms that live at the bottom of a lake
Benthos	the bottom of the ocean or body of water
Bentonite	a rock composed of clay-like material formed by volcanic ash or tuff. Bentonite beds are common in shade or limestone from the Paleozoic time
Biochemistry	study of chemical processes in living organisms
Biodiversity	pertaining to the variety of species in an area
Biogenic	produced by living organisms or biological processes
Biogenic emission rates	the speed that volatile organic compounds are released into the surrounding environment
Biogeography	the science that deals with distribution of all living organisms
Biomass	the total amount of all living material within a specific volume of the environment
Biomes	distinct areas of the Earth that are common in climate conditions, life forms and physical features like the tundra or woodland
Biostratigraphy	identification and differentiation of rocks based on the types of fossils they contain
Bituminous	a term used to describe many forms of solid/semi-solid hydrocarbons that are either synthetic or found in nature
Brachiopods	marine invertebrates characterized by their filamentous feedings organs and two bilaterally symmetrical valves that make up its shell
Brittle stars	a marine organism belonging to the same family as sea stars and sea urchins that is commonly fond in Arctic regions in shallow waters
Calcrete	a mix of gravel and sand cemented by calcium carbonate
Carnivore	a flesh eating animal
Characterized	to describe something
Chlorophyll a	a pigment in plants that give them their green colour and which absorbs energy from the sun. Plants use Chlorophyll to change carbon dioxide and water into food and oxygen
Classification	organize into groups or categories

Cockles	a sea clam with a shell that looks like a heart used for food
Compliance	an agreement with something
Comprehend	being able to understand
Comprehensive	conveying or including everything or almost everything
Coniferous woodland	a wooded area that is dominated by trees with pines
Conifers	a group of woody plant commonly known as evergreen trees such as pine, spruce or fir that bears cones.
Connectivity	how well something is able to connect or relate with another thing
Convection	a transfer of heat through agas or liquid by currents
Coral	a hard substance like stone found in tropical seas. Coral is made from the skeletons of tiny marine organisms
Cores	a archaeological term describing a lump of stone which is left after flakes have been removed
Correlated	a mutual relation between two comparable things
Cosmopolitan	consisting of a group of individuals from around the world
Crinoids	a sea urchin that has feathery arms
Cumulative	things that add together
Dark septate endophytes	tiny fungi that grows underground into tree roots
Deducing	draw a conclusion
Deformation	a measurable change in structure
Degradation	to reduce something or to place something at a lower level
Densities	a quantity of mass per unit volume
Devonian	a period between 410 and 370 million years ago when terrestrial plants began to spread across the land as well as much development in aquatic animals such as fish and other shell fish
Diamiction	glacial soils with clay, sand, gravel and boulders mixed together
Diatom	microscopic one-celled marine or fresh water alga having cell walls that contain silica (a white colorless glass-like solid that doesn't dissolve
Disjunct	refers to separate societies
Diversion	a changing of the direction in which something is going
Dorsal fin	the fin on a marine animal that is located on its backside
Ecology	the science that deals with how living organisms live in relation to each other and their environment

Ecological integrity	ensuring the relationship in plant and animal communities remains healthy
Ecophysiological	pertaining to an individual organisms response to the factors in the environment such as temperature
Ecosystem	living organisms and non-living structures that work together to form a system
Effluent	something that flows out from a main source, such as sewage or waste matter
Electro-fishing	using electricity to stun and kill fish, usually used during scientific scenarios
Electromagnetic	magnetism that is caused by electricity
Emissions	something that is radiated outward or discharged from a source
Endophytes	a plant that grows underground or under a tree
Eocene	a time when small mammals began to develop on Earth between 54 and 38 million years ago.
Epoch	a period of time during which something important developed or happened
Erosion	group of natural processes (weathering, disintegration, abrasion, corrosion, transportation) where the Earth's surface is worn away and removed
Eskers	a long, narrow ridge of coarse gravel deposited by a stream flowing under a decaying glacial sheet of ice
Estuary	a place where coastal seawater comes into contact with the current of a freshwater stream
Evolution	a process where different species come into existence by differentiation and genetic mutations from common ancestors over a long period of time.
Excavated	extracting or revealing something by removal of the surrounding earth
Extant	organisms that are still present on the Earth today
Fauna	an animals life relating to environment, or geological time
Fibril	a smaller unit of an individual fibre
Fluvial	pertaining to something's existence or growth around a stream or river
Fossil	trace of an organism of a past age, embedded and preserved in the Earth's crust
Fungi	a kingdom of heterotrophic organisms that produce spores
Gastropod	a marine organism that characteristically has a single, usually coiled shell or no shell at all, a ventral muscular foot for locomotion, and eyes and feelers located on a distinct head
Gender	a socially determined sexual role based on a persons characteristics or traits
Genetic	pertaining to an organisms traits or characters being linked to genes
Genera	a class of organisms that shared common characteristics

Geochemistry	a science that deals with the chemical composition of and chemical changes in the solid matter of the Earth
Geochronological	the chronology of the earth's history as determined by geologic events and not by human history
Geomorphologic	pertaining to the physical features of the Earth's surface
Glacial refugia	An isolated area where glaciers underwent little environmental change
Glyptostrobus pensilis	a species of conifer that has the common name of water pine
Gneisses	A banded or foliated metamorphic rock, usually of the same composition as granite
Grams	a unit of measurement for mass
Granitic rock	light colored coarse-grained rock that was formed at great depths such as quartz
Habitat	a place where organisms can live
Hearth	the area in front of a fire place
Heterogeneity	a situation where something is in a mixed composition
Holocene	the most recent 11,000 years of the Earth's history starting at the end of the last major ice age, which has been relatively warm
Host specificity	how selective a parasite is when looking for a host live off of as a source of food
Hydraulic	pertaining to movement caused by water
Hydrology	science dealing with the properties, distribution and circulation of water
Implemented	to put into effect
Inoculated	to introduce to an organism
Iron	a metallic element used for making tools and essential for all living organisms survival
Kitigaaryumiut	the traditional gathering place where the Kitigaaryumiut people would hunt beluga and hold celebrations
Larix	a genus of boreal trees commonly known as Larch, which range includes the circumpolar region and some mid-high altitudes in the south
Larvae	a premature stage for an insect where it feeds a lot before it becomes a pupa
Latitude	a measurement of the angular distance from the equator to a given point on the Earth's surface
Lenticular	resembling the shape of a cross section of a lense
Liliaceae	a family of mostly perennial herb-like plants about 280 genera and 4,000 species

Limestone	a sedimentary rock that contains mostly calcium carbonate and can be formed by either inorganic or organic processes
Limnology	The scientific study of the life and phenomena of fresh water, especially lakes and ponds
Manganese	a metallic element that is used to make alloys
Metamorphosed rock	any rock derived from pre-existing rocks by changes in response to environmental factors such as temperature, pressure and shear stresses
Metasquoia	a Dawn Redwood that belongs to the conifers
Methane	the simplest hydrocarbon that is the main ingredient in natural gas
Microbes	bacteria that can cause disease
Microclimate	the climate close to Earth's surface or the climate of a small area
Microfossils	a very small fossil that needs the aid to a microscope to view it
Microorganisms	organisms that must be viewed under a microscope such as bacteria or a virus
Migration	the long range movement of a group of animals based on the seasons
Molecular analysis	a detailed look at the chemical structure and properties of a molecule
Moraine	a mound of rock debris carried and deposited by a glacier
Morphometric	measurements taken at designated places to compare individuals of a species
n-butanol	an isomer of the alcohol butanol - C_4H_9OH
Nested Plots	in an experiment, designated areas are place out along a transect line to gather data
Oligotrophic	a pond or lake lacking in plant nutrients and having a large amount of dissolved oxygen throughout
Organic	material pertaining to plants or animals
Outcrop	A portion of bedrock or other stratum protruding through the soil level
Overlie	sedimentary or volcanic rock that lays on top of older rock
Paleo-Eskimo	the people who migrated across the north around 2000 years ago, but it is not known if they are the ancestors of the modern Inuit
Paleoecological	a relationship or study of ancient organisms and how they related to their ancient environment
Paleoenvironmental	an environment that existed in the past
Paleohydrological	a study regarding the ancient water features preserved in rocks
Paleolimnological	a study regarding the ancient lake conditions by looking at its sediment

Parameter	one set of measurable factors, such as the temperature and pressure, that define a system and determine its behavior and are varied in an experiment
Parameterized	expressing something in terms of a parameter
Pertinent	something is relevant to the topic
Physiological	pertaining to the physical structures and function of living organisms
Phytoplankton	a group of plant-like plankton that all sea animals depend on either directly or indirectly
Pixel	a single unit of a television or computer screen that is responsible for the picture
Pleistone	an age of notable ice ages and development of man between 2,000,000 and 10,000 years ago
Polycycle thaw slump	a depression with underground drainage that reflects many base-leveling for more than one sea-level
Postglacial	relating to or occurring during the time following a glacial period
Putative	meaning to assumed something
Qualitative	complete detailed descriptions usually taken from a small sample that allows for distinctions to be drawn from the data
Quantitative	use of large amounts of data where statistics can be applied to interpret the data
Radiocarbon dating	The determination of the approximate age of an ancient object, such as an archaeological specimen, by measuring the amount of carbon 14 it contains
Raptor	a bird of prey such as an eagle, falcon or osprey
Reef	a structure formed by coral and their remains that lie above the bottom sediment
Reticular	a system that adopts a network design
Revitalization	to give new life or vitality to something
Sandstone	sedimentary rock that contains fine-grained fragments that are firmly cemented together
Satellite imagery	computer images generated by a satellite which allow researchers to look at a specific area and monitor surface features such as vegetation
Sediment	solid fragment material that occurs form the weathering of rocks. In water it is material that has settled form a state of suspension
Sedimentary rock	rock derived from loose particles that have accumulated over time
Sedimentation	the process where small particles are moved and deposited to accumulate into layers
Seiche events	An environmental event such as pressure or especially high winds generate a change in a lakes water level or wave level

Seismic	pertaining to vibrations in the Earth, both natural and induced
Shovel testing	a crude test where a sample of ground is taken by use of a shovel
Siltstone	silt having the texture of shale
Skeptical	to have doubt
Solutes	a substance that has dissolved
Species	a group of organisms that share common characteristics that group them together and also distinguish them from others.
Sponges	aquatic organisms that characteristically have a porous skeleton composed of fibrous material and often form colonies attached to an underwater surface.
Stone flakes	debris left over from a rock while making tools
Stratified	a system that is set up in layers or strata
Stratigraphic	formation of rock where different layers can be picked out based on type and age of the rock
Succession	a progressive change in the biological community as a result of a response from species to the changing environment
Surficial	pertaining to something that is on the surface
Suspension	a situation where the medium is able to support the weight of the particles trap inside it
Systematic	done according to a plan
Thermatic	pertaining to a cause of heat
Thermokarst	sinking holes, caves and underground drainage that are produced in regions with permafrost from melting of ground ice and settling of the remaining ground
Thermokarst lakes	lakes where water is trapped in a cut off karst region
Thule Eskimo	a culture which arose in the Northwest Alaskan parts about 1100 years ago. They are considered to be the ancestors to many of the modern day Inuit
Topography	a description of the surface of a given area
Trace metals	a metal that is not essential in the sample but is found in small quantities
Tracheid	a pitted long cylindrical tube in the xylem of a plant used for water conduction
Transect	an imaginary line across a surface where observations are made
Tributary	a place where a stream feeds into a larger stream or lake
Trilobite	an ancient group of marine organisms that represent some of the oldest arthropods known and whose fossils are often found in rock

Turbid	stirred up material suspended in a medium leaving it unclear and opaque
Unconformity	a large break in the chronological sequence layers of rock
Vascular plants	a group of plants that have developed a good conductive system and that have structural differentiation
Velocity	the average displacement of and object over a given time
Volatile	an easily vaporized compound
Watershed	the region draining into a river, river system, or other body of water
Younger Dryas	the most significant rapid climate change event that occurred during the last deglaciation of the North Atlantic region

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