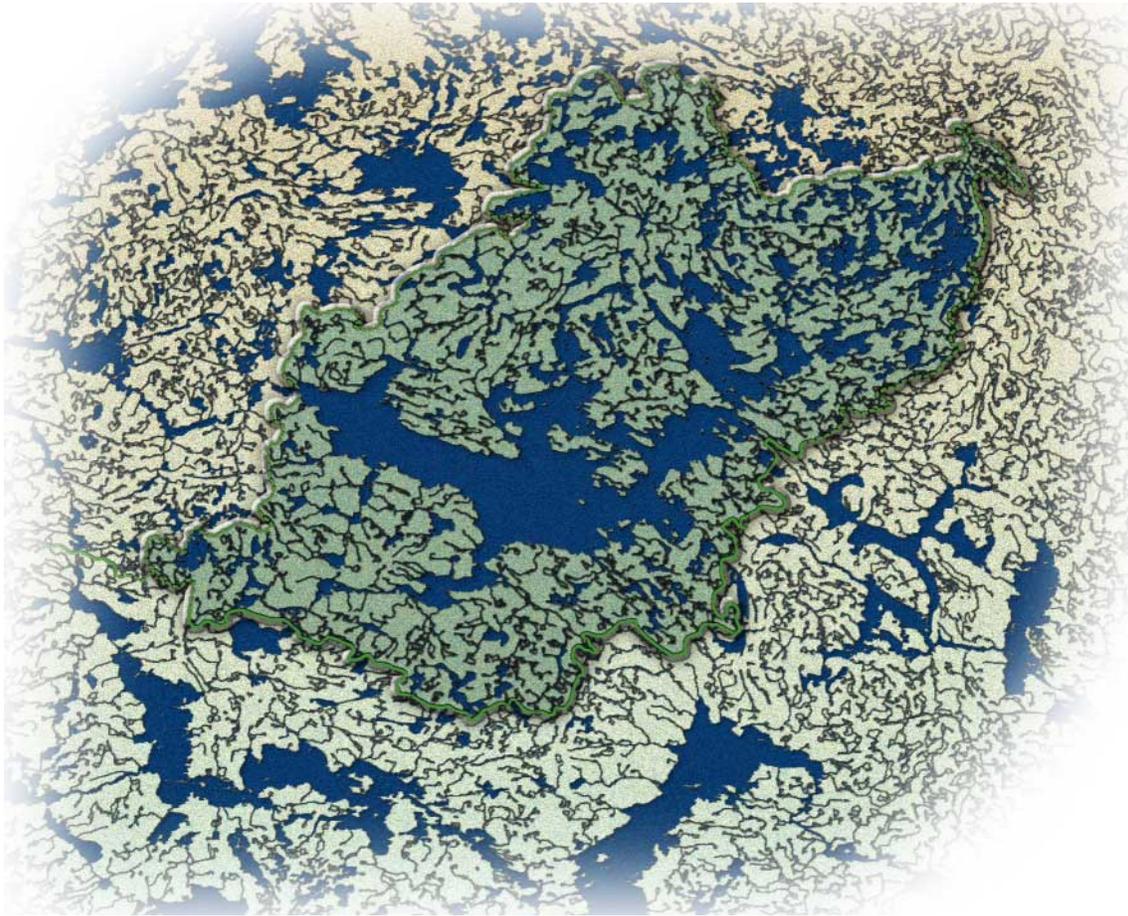




Lac de Gras

Drainage Basin Study



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June 1998





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26 June 1998

David Milburn
Manager
Water Resources Division
Yellowknife, NT

Dear David,

The following document is the final report on the Lac de Gras Drainage Basin Study field investigations conducted in July 1997 in co-operation with the Lutsel K'e Dene First Nation, Yellowknives Dene First Nation and Diavik Diamond Mines. The purpose of the field study was to determine if there was outflow from Lac de Gras to the south into the Aylmer Lake - Lockhart River drainage basin. Community elders and representatives of the Land and Environment Committees from both First Nations participated in the field study, which consisted of aerial and ground surveys along the drainage basin divide (height-of-land) and the shoreline of Lac de Gras. From the field surveys, we were able to conclude that there is no surface outflow from Lac de Gras into the Aylmer Lake - Lockhart River system.

A letter from the Yellowknives Dene First Nation, attached in Appendix 4 of the report, provides additional comments and recommendations for additional studies.

Sincerely,

Bob Reid

Hydrologist



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Introduction

Concerns about the transport of mine effluent contaminants into the Lockhart River system were raised by elders from the Lutsel K'e and the Yellowknives Dene Bands at the NWT Water Board public hearings in 1996 for the BHP Diamonds water license (Appendix 1). The elders stated that outflow from Lac de Gras to the Aylmer Lake - Lockhart River system is known to occur. As a result of this information, the NWT Water Board Chair requested that DIAND conduct a study to determine if there is outflow from Lac de Gras to the Lockhart River system (Wray, 1996). The DIAND Minister agreed that a study was necessary to "determine if there is any significant southward drainage from Lac de Gras to Great Slave Lake" and to address the concerns of the band elders (Irwin, 1997).

After the public hearing, meetings were held with the environment committees and elders in Lutsel K'e and Dettah to answer the concerns of the elders regarding flow from Lac de Gras to the south. As the topographic maps of the area do not show any rivers connecting Lac de Gras to the Lockhart River system, it was decided through the community consultations that an initial study would be necessary to learn if there is flow from Lac de Gras to the south via Courageous, Mackay or Thonokied Lakes into the Aylmer Lake - Lockhart River system. If so, subsequent studies would address potential environmental effects in the Lockhart River and Great Slave Lake from the diamond mine developments at BHP Koala (EK'ati) and Diavik Diamond Mines, or from other future developments in the Lac de Gras basin.

Study Objective

The objective of the basin survey was to determine whether there is outflow from Lac de Gras to the south, into the Aylmer Lake-Lockhart River system.

Preliminary Investigations

To address the concerns of the elders raised at the public hearing, meetings were held in Lutsel K'e with the community elders, the environment committee and hydrologists from DIAND Water Resources. The purpose of the meetings was to identify areas on topographic maps (NTS 1:250,000 map sheets 76C Aylmer Lake and 76D Lac de Gras) where outflow from Lac de Gras to the south may occur. The elders were asked where they have travelled and where they thought the water might flow from Lac de Gras into the Aylmer Lake - Lockhart River system. The Lutsel K'e elders identified three sites: a long narrow saddle valley (64°31.26'N, 109°56.61'W) between the southeast corner of Lac de Gras and the northwest finger on Thonokied Lake; the Seahorse Lake area (64°18'N, 111°15'W); and north of Starfish Lake (64°24'N, 111°40'W). From the discussion during the mapping exercise it was decided that travel to the Lac de Gras basin area was necessary to verify the drainage connections and directions.

The Yellowknives Dene Band had prepared a map that identified the Lac de Gras drainage basin and showed four areas to investigate for possible hydrological connection to the Aylmer Lake - Lockhart River system. Three sites were the same as above and the fourth site (64°20'N, 110°00'W) was between Lac de Gras and the north end of MacKay Lake, by the Echo Bay winter road portage.

Study Proposals

A study proposal was prepared by DIAND Water Resources, Yellowknife, to conduct a helicopter survey of the Lac de Gras basin to verify the drainage direction and the location of the height-of-land. The proposed survey would include representatives from Lutsel K'e and the Yellowknives Dene Band with accommodation provided by Diavik. Costs for the study were estimated at \$30,000. This proposal was



submitted to the Northern Water Resources Study Program, a funding program administered by DIAND Water Resources, Ottawa. The NWRSP panel approved \$15,000 for project funding. The balance was provided by DIAND Water Resources, Yellowknife and the two band councils (Appendix 2).

A proposal was also prepared by the Lutsel K'e Land, Wildlife and Environment Committee for a four week trip by canoe and boat from Lac de Gras through Thonokied Lake and Aylmer Lake to Great Slave Lake (East Arm). From Aylmer Lake the party would split into two groups and continue to East Arm via different routes: one group would travel through Clinton-Colden Lake and down the Lockhart River to Artillery Lake and Fort Reliance; the other group would travel to the south end of Aylmer Lake, then through Fletcher, Walmsley and Cook Lakes to the Lockhart River and Fort Reliance. The proposal, with an estimated cost of \$75,000, was submitted to the West Kitikmeot/Slave Study office but was not accepted for funding.

Field Program Participants

The participants for the trip to Lac de Gras were selected by the communities and environment committees. The elders from Lutsel K'e participating in the field program were Jonas Catholique, Joe Michel and Noel Drybone. Lawrence Catholique attended as a member of the Lutsel K'e Wildlife, Lands and Environment Committee and did the translation with the Lutsel K'e participants. The choice of accommodations, to stay at Diavik's camp rather than set up a bush camp, was made by the Lutsel K'e elders.

The participants from the Yellowknives Dene Band were Fred Sangris, representing the Lands and Environment

Committee, Alexie Mackenzie and Edward Doctor. Jennifer Bowen from the Native Communication Society of the Western NWT attended on behalf of the Yellowknives Dene to record the trip on video.

Erik Madsen, Manager of Site Environment, Diavik Diamond Mines, accompanied the field party on the first afternoon of the field investigation.

Field Investigations

The watershed boundary (height-of-land) between Lac de Gras and the headwater lakes of the Lockhart River system was the initial focus of the field investigation. The height-of-land had been marked on the 1:250,000 NTS map sheets (76C & 76D) based on the contour lines, lakes and streams. The line marking the height-of-land was flown at low altitude to verify the water drainage directions (Map 1). Navigating at low level through the myriad of small lakes and streams was challenging and on several occasions it was necessary to break off the flight path and gain altitude to re-orientate the navigator and/or the pilot.

The field program was conducted in two phases, with two days of flying in approximately the same areas with each group. The areas identified by the elders and the streams along the south shore of Lac de Gras were observed from the air to determine the water flow direction. Ground surveys were made when flow direction could not be determined from the air and at the sites identified on the maps by the elders. Both groups made ground surveys at the saddle valley and Seahorse Lake. A detailed description for specific areas of the aerial and ground surveys are given below. The site numbers correspond with the locations marked on Map 1.



Map 1. Lac de Gras Study Area, Spring 1996.



Site 1. Lac du Sauvage Outlet (64°31'N, 110°02'W)

The investigation of the Lac de Gras drainage basin started with a ground survey at the narrows between Lac du Sauvage and Lac de Gras. A substantial flow from Lac du Sauvage into Lac de Gras was observed. (Photo #1)

Photo 1. Narrows between Lac du Sauvage and Lac de Gras, looking east towards Lac du Sauvage (Site 1).





Site 2. The Saddle Valley (64°31.26'N, 109°56.61'W)

The shoreline of Lac de Gras was followed southeastward from the narrows at the Lac du Sauvage outlet to the saddle valley area. The saddle valley was flown from Lac de Gras to Thonokied Lake along the chain of small lakes. Slow, low level flights verified that the flow direction from the first two lakes is northward into Lac de Gras. The next series of lakes drain to the south into Thonokied Lake. The helicopter altimeter was used to determine the elevation change from Lac de Gras to the height-of-land between the small lakes. The pilot touched down on the beach adjacent to the outfitting camp on Lac de Gras and the altitude was recorded at 1400 feet above sea level (asl). At the height-of-land an elevation of 1450 feet asl was recorded when we landed for a ground survey. From the ground at the height-of-land, the elevation above Lac de Gras was evident.

The height-of-land was walked to the hills on both sides of the saddle valley. Indistinct flow channels coming off the side hills passed through patches of dense low vegetation above the divide lakes. Ground surveys were done with both the Lutsel K'e and Yellowknives groups at the saddle valley site and verified that a distinct drainage divide between Lac de Gras and Thonokied Lake was present (Photos 2 - 4).



Photo 3. Height-of-land in the saddle valley (Site 2), looking east.

A second higher valley runs parallel to the saddle valley immediately east of a low ridge and esker. This valley was followed from Thonokied Lake to Lac de Gras and the height-of-land was observed where the esker cuts across the valley. From the air it was evident that the elevation at the top of the second valley was higher than the first saddle valley. At the north end of the second valley, the flow into Lac de Gras was visible from the helicopter. It was agreed by both the Lutsel K'e and Yellowknives groups that there is no flow from Lac de Gras to Thonokied in the saddle valley area.



Photo 2. Lutsel K'e participants in the saddle valley (Site 2).



Photo 4. Height-of-land in the saddle valley (Site 2), looking south.



Site 3. Winter Road Portage (64°24'N, 110°00'W)

The height-of-land was followed from the saddle valley to the winter road portage, south of Echo Bay's road camp by Lac de Gras. North of the lake at 64°21'N, 110°00'W, the flight path was altered from the line on the field map in order to remain on the height-of-land. By following the inflow streams it was verified that the drainage divide line drawn on the field map was incorrect. The outlet of the 64°21'N, 110°00'W lake was followed to the northeast where the stream flowed into a finger of Thonokied Lake at 64°22'N, 109°55'W. The 1:250,000 map sheet (76C - Aylmer Lake) shows a break in the drainage before reaching Thonokied Lake, rather than the outflow stream that exists. The line marking the height-of-land on the field map was redrawn on the west side of the lake based on the aerial survey.

A ground survey north of the 64°21'N, 110°00'W lake was made with the Yellowknives group. We landed on the winter road grade at 64°24.20'N, 110°04.28'W, approximately two kilometres south of the Echo Bay road camp. Streams on both sides of the road grade were checked and it was determined that the flow direction was to the north (Photo 5 & 6). The height-of-land between the Thonokied Lake and Lac de Gras drainage basins was observed between two small lakes, a few hundred metres south of where we landed. At the south end of the 64°21'N, 110°00'W lake, the height-of-land between Thonokied Lake and MacKay Lake was identified amongst the sand ridges of an esker complex. The Lac de Gras-MacKay Lake height-of-land was identified at the southwest end of the 64°21'N, 110°00'W lake and was followed to the west.



Photo 5. Winter road portage (Site 3), Echo Bay road camp in background.



Photo 6. Winter road portage (Site 3), direction of stream flow is northward.



Site 4. Seahorse Lake (64°18'N, 111°15'W)

The height-of-land was followed along the low plateau from the 64°21'N, 110°00'W lake westward to the Seahorse Lake area. Seahorse Lake (64°18'N, 111°15'W) was identified by the elders as being a traditional travel route between Courageous Lake and Lac de Gras. The drainage divide between Seahorse Lake and the south arm of Lac de Gras was evident from the air at the northeast and north side of Seahorse Lake (Photo #7). However, the divide at the northwest end of Seahorse Lake was indistinct and a ground survey was necessary to determine water flow directions. The north end of a small lake at 64°20.34'N, 111°16.12'W was checked during ground surveys with both the Lutsel K'e and Yellowknives groups (Photo #8). The ground survey determined there was no stream connection to the north with Lac de Gras. At the south end of the 64°20.34'N, 111°16.12'W lake the outflow to Seahorse Lake through a low marsh was minimal, but visible.

The aerial survey along the height-of-land was continued for a few kilometres west of Seahorse Lake before turning back to investigate the tributaries of Seahorse Lake. Inflow streams on the north and west sides were observed and the shallow rocky outlet channel of Seahorse Lake was followed south to Courageous Lake.



Photo 7. Height-of-land northeast of Seahorse Lake (Site 4).



Photo 8. Ground survey northwest of Seahorse Lake (Site 4) with Yellowknives Dene representatives.

Site 5. Starfish Lake (64°24'N, 111°40'W)

The northeast shore of the west arm of Courageous Lake was followed to Starfish Lake (64°24'N, 111°40'W), which has a distinct flow into Courageous Lake. The flow direction was verified by Edward Doctor, who has fished this area. At the northwest end of Starfish Lake the inflow was followed upstream past several small lakes to the drainage divide in an esker complex. The divide was apparent from the air, so ground surveys were not conducted in this area. From the drainage divide, the northward flowing stream was followed through a series of long narrow lakes to the Coppermine River and Lake Providence. From Lake Providence the Coppermine River was followed upstream to the outlet of Lac de Gras.



Site 6. Lac de Gras outlet

A stop was made at the outlet of Lac de Gras (64°35'N, 111°07'W) with the Lutsel K'e group. Both groups flew over the outlet and observed the substantial flow from Lac de Gras to the Coppermine River (Photo #9).



Photo 9. Coppermine River below the outlet of Lac de Gras (Site 6).

The South Shore of Lac de Gras

The southwest shoreline of Lac de Gras was followed at low level back to the south arm (64°22'N, 110°40'W). High ground was evident to the south all the way back to the south arm. The large inflow stream at the southwest end of the south arm (64°22'N, 110°54'W) was followed right up to the drainage divide near Seahorse Lake. All the streams on the south side of Lac de Gras between the south arm (64°22'N, 110°40'W) and the saddle valley (64°31.26'N, 109°56.61'W) were followed until a visual verification of flow direction was made. In all cases, these streams flowed northward into Lac de Gras.

The Northeast Side of Lac de Gras

A flight was made to the east end of Lac du Sauvage to check inflows. High ground was evident to the south and east of Lac du Sauvage. From the east end of Lac du Sauvage, we flew to the rapids on the upper Coppermine River (64°40'N, 110°04'W) where it flows south into Lac du Sauvage. Outflows from Duchess Lake and Ursula Lake were observed flowing southward to Lac du Sauvage. To the west, the outflow from Paul Lake (64°39'N, 110°29'W) was followed to Lac de Gras. From Paul Lake we flew cross country to the BHP Koala camp and followed the drainage of Long Lake and Panda Lake downstream to Slipper Lake and Lac de Gras. After circling the new infrastructure at the Koala (Ek'ati) camp, we flew north from Long Lake and identified the drainage divide between Long Lake and Exeter Lake.

Conclusions

The height-of-land marked on the NTS 1:250,000 map sheets was followed from the Lac du Sauvage narrows to west of Seahorse Lake (the entire south side of Lac de Gras) and in the Starfish Lake area. The solid line on Map 1 shows the verified drainage divide between Lac de Gras and the headwater lakes of the Lockhart River system. The streams on the south shore of Lac de Gras were also investigated to determine if there was any outflow to the south. All the streams between the south arm of Lac de Gras and the saddle valley were visually observed to flow north into Lac de Gras. From the aerial and ground investigations it can be concluded that there is no surface outflow from Lac de Gras into the Aylmer Lake-Lockhart River system via Courageous, MacKay or Thonokied Lakes.



References

Wray, Gordon, Water Board Chair, letter dated December 18, 1996 to DIAND Minister Ron Irwin:

“The Dene elders who appeared at the public hearings raised the possibility that there was southward drainage from Lac de Gras. I understand your department has had some preliminary meetings with the First Nations on this issue and would urge the department to complete this work and report back to the First Nations on the results of the findings.”

Irwin, Ron, Minister of DIAND, letter dated Jan 3, 1997 to Water Board Chair Gordon Wray:

“The department will complete the work necessary to determine if there is any significant southward drainage from Lac de Gras to Great Slave Lake. As you have noted, this work is being done in co-operation with the Aboriginal elders, who raised the matter during the public hearing.”

Appendix 1

BHP Water Licence Hearing: Transcript Excerpts

Source: BHP public hearing transcript, September 9-10, 1996

Dettah Elder Judy Charlo (in translation)

It sounds like there is only one river that is flowing into the Coppermine River. There are a lot of rivers around the Lac de Gras area that flow in all directions. ... I also heard that the river flows from the Lac de Gras area to the Coppermine area, but there are a lot of rivers that flow into all directions. Why are they saying there is only one river that flows into the Coppermine? ... Even this summer, we went to Mackay lake. There is a trail all the way to Mackay Lake. (page 105-6)

Fred Sangris, interpreting Elder Charlo's comments:

In the Lac de Gras area there are many rivers and streams that flow from Lac de Gras down into the East Arm and into the Lockhart River ... and then it flows into the Great Slave Lake. ... Is that (t)he rivers flow, which way will the waste flow, the waste from the exploration? There are many rivers and streams. There is one Coppermine River that splits and part of the Coppermine River flows down south into the Great Slave Lake and into the Lockhart River and the East Arm and then down into Great Slave Lake. (page 108-9)

and further said:

The watershed in the Lac de Gras area may be very complicated, but there are approximately 75 inlets and outlets to Lac de Gras. Part of the river which is Lac de Sauvage flows into Contwoyto Lake and then south into the Thelon River and eventually into Great Slave Lake. What is BHP prepared to do for further study? That Lac de Gras watershed that was presented this morning is inaccurate. (page 112)



But what the Elders and I are saying here is that there is not only one river system, there is a lot of river systems. Part of that river which is the largest one, flows into the Artillery Lake and then flows into Lockhart Lake, into Lockhart River and then into the East Arm of Great slave lake. ... our information is based on thousands of years. (page 113)

Lutsel K'e Elder JB Rabesca, in translation:

The river I am talking about, it is called in my own language Lac de Gras. That river runs to Ptarmigan lake and from Ptarmigan Lake to Artillery Lake, then from there it flows down the Lockhart River to Great Slave lake. The Ptarmigan Lake that I am talking about , further up it flows into the Thelon River. (page 117)

Lutsel K'e representative Archie Catholique:

These are the recommendations from Lutsel K'e First Nation. ...

4) *BHP should be required to do some research on the drainage from Lac de Gras to Clinton Golden; to Artillery Lake; and then to Great Slave Lake down the Lockhart River, recognizing and acting on the traditional knowledge our Elders described in their presentation earlier.*

... I do have concern regarding (Perry Falls) because of the way the rivers that the drainage might come through that area also. It is not only the Lockhart River. Also there is the river that flows into Hoarfrost, from Hoarfrost to the east side of the north. So you see there is a lot of area that the rivers are flowing into the Great Slave Lake and I think those too have to be taken into consideration that there should be a study also. (page 119)

Dettah resident Rachel Crapeau:

This past month we went by canoe from the Yellowknife river all the way up to Mackay Lake. You can see how the water moves and which way it flows. It comes down to here, to the Yellowknife River.

**From the transcript of the Water Board hearing
October 21-22, 1997.**

Yellowknives Chief Beaulieu:

At the Water Board hearing the Elders indicated that the water flows as indicated by the Proponent only went one way and that was up the Coppermine River. The Elders, from their experience indicated that the water flows down to Great Slave Lake and that we are instream users - either through the Yellowknife River System and/or the Lockhart River System; and that is an important factor that the Board was to consider. (page 87)

Lutsel K'e elder John Rabesca (translation):

There is a lake called Lac de Gras. There is a lake also we have our own names. They have that name because there is a white sand around, there is a lot of white fox at the time I used to go trapping. From Lac de Gras there is a river that flows and from there it goes all the way to Ptarmigan Lake. From there it flows into Artillery lake and from there it goes down the Lockhart River and into the Great Slave Lake. (page 96)

Lutsel K'e First Nation staff member, Ellen Bielawski:

I am going to quote partly from the answers that we received from BHP to the questions that we submitted - primarily about the question of the drainage through Lac de Gras and eventually into Great Slave Lake. Their answer to our questions states: "based on topographic interpretation, two areas were identified that exhibited the potential of shared headwaters. Study Area 1 is identified on the enclosed copy of National Topographic Series 1:250,000 scale map 76C and study area 2 is defined on the enclosed copy of NTS 1:250,000 map 76D. In both instances, elevation changes between Lac de Gras and the height of land indicated that there was not the potential for flow from Lac de Gras to reach the Lockhart River System."



First, this is a technical point - we did not receive the enclosed maps. ... Another point that I want to raise about that, is the question of the sampling question of interpellating (sic) from NTS Series maps which are based on aerial photography to what is actually going on, on the ground. From my own experience in field work, I have walked many a mile based on these maps and air photos and I know many of you have, and I know that you are quite aware of the inaccuracies that result. (page 99)

... Having said all of that (about traditional knowledge and science), we are faced with the question of examining the issue of the watershed. The first Public Hearing was the 9th of September and we are now into freeze-up. We have entered some evidence in maps, we know we have not adequately addressed that question. (page 102)

Chris Spence, Hydrologist for Water Resources at DIAND:

I have a question for Mr. Rabesca of Lutsel K'e concerning the direction of the drainage. Mr. Rabesca speaks of flow from Lac de Gras down to Ptarmigan Lake. From my knowledge of the area, Ptarmigan lake is some distance from Lac de Gras. could he explain specifically, how the flow gets from Lac de Gras to Ptarmigan Lake, if not tonight then another time, maybe providing us with maps of the direction of flow? Could he also tell us, what time of year he was most commonly in the area? (page 106-7)

Chair Gordon Wray replied:

Thank you. I will, at this time, advise you that the Board will be specifically dealing with that issue in its dealings with TAC and its direction to TAC. So perhaps we will hold off on the answer to that because it will be dealt with much more comprehensively. (page 107)

Mr. Lemon, representing Yellowknives Dene and Lutsel K'e Dene:

... The Yellowknives Dene and Lutsel K'e Dene have a specific concern with respect to the flow of water from the Lac de Gras watershed, possibly into the Great Slave system. The Elders have identified a number of spots where that concern is a real concern to them. We simply ask that in the terms and conditions of the Licence, that, that be considered and there be monitoring to be sure that, that in fact is not happening, that polluted water is not going down into the Great Slave. (page 215)



Appendix 2

Lac de Gras Drainage Basin Study - Field Trip Expenses

1. Participation of Lutsel K'e Band members

Air Travel - Lutsel K'e to Yellowknife (charter)	\$ 610
Air Travel - Diavik to Yellowknife (charter)	\$ 1,570
Air Travel - Yellowknife to Lutsel K'e - Tindi sked (4 people @ \$100/ticket plus expenses)	\$ 520

2. Aerial & Ground Surveys

Astar 350B2 helicopter (16 hours @ \$1100/hour)	\$ 17,640
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3. Helicopter Fuel (purchased from Diavik)

Jet-B Fuel (16 drums @ \$250/drum)	\$ 4,280
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4. Accommodation at Diavik Camp (provided by Diavik)

6 people x 2 nights @ \$100/night - \$ 1200	\$ 1,400
2 people x 1 nights @ \$100/night - \$ 200	

5. Consulting Fees (contributed by respective bands)

Lutsel K'e Dene Band (3 elders * 100/day * 2 days)	\$ 600
Yellowknives Dene Band (2 elders * 100/day * 2 days)	\$ 400

6. Translation Fees (contributed by respective bands)

Lutsel K'e Dene Band (2 days * 250/day)	\$ 500
Yellowknives Dene Band (2 days * 250/day)	\$ 500

7. Miscellaneous Supplies - Maps, Film & Processing

	\$ 185
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Total Project Costs

	\$ 28,205
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Funding Sources

Northern Water Resources Study Program (DIAND)	\$ 15,000
DIAND Water Resources	\$ 9,805
Diavik	\$ 1,400
Lutsel K'e Dene Band	\$ 1,100
Yellowknives Dene Band	\$ 900
	\$ 28,205



Appendix 3

Lac de Gras Drainage Basin Study - Field Trip Log

Participants

Lutsel K'e Group

1. Lawrence Catholique
2. Noel Drybone
3. Joe Michel
4. Jonas Catholique

Dettah Group

1. Fred Sangris
2. Alexie Mackenzie
3. Edward Doctor
4. Jennifer Bowen

Co-ordinator

Bob Reid, DIAND Water Resources, Yellowknife

21 July

- 0700 - Bob departed Yellowknife (fixed wing charter) to Lutsel K'e, arrive 0755.
- 0820 - depart Lutsel K'e, arrive Yellowknife 0910.
- 1040 - depart Great Slave Helicopters, Bell 204B substituted for Astar (at the AStar rate).
- 1220 - arrive at Diavik camp on Lac de Gras, lunch, checked into accommodation.
- 1410 - depart Diavik camp for aerial surveys of Lac du Sauvage, saddle valley, height-of-land.
- 1800 - returned to Diavik camp.

22 July

- 0830 - airborne with AStar for aerial and ground surveys in Thonokied Lake area.
- 1230 - arrive back at Diavik camp for lunch.
- 1345 - airborne for Seahorse Lake area for ground surveys, stopped at Salmita mine site.
- 1700 - stopped at Coppermine River at outlet of Lac de Gras.
- 1800 - depart to Diavik, did fly-by of Koala (Ek'ati) mine site.

1835 - returned to Diavik camp for dinner.

2015 - over to Yellowknives camp with elders to discuss investigations.

2130 - back to Diavik.

23 July

- 0850 - airborne to Yellowknives' camp, flew to saddle valley, winter road portage,
- 1000 - Lutsel K'e group depart by fixed wing charter to Yellowknife, on to Lutsel K'e on Air Tindi 1630 sked.
- 1215 - back at Diavik camp for lunch.
- 1320 - airborne for MacKay Lake, Seahorse Lake, Starfish Lake, Lac de Gras south shore.
- 1645 - dropped off Yellowknives group at their camp.
- 1700 - arrived at Diavik camp for dinner.
- 1900 - met with Erik Madsen in evening to discuss findings.

24 July

- 0830 - airborne to Yellowknives camp, flew south shore of LDG from Kennecott tent camp along the way.
- 0850 - picked up Yellowknives group, aerial surveys of Lac du Sauvage, Ursula Lake, Paul Lake, Koala (Ek'ati) mine site and Exeter Lake drainage.
- 1215 - return to Diavik camp for lunch.
- 1310 - drop off Yellowknives group at their camp, continued south to outlet of MacKay Lake, Courageous Lake, and stopped at Salmita.
- 1500 - departed Salmita for Yellowknife.
- 1615 - arrived at Yellowknife.



Appendix 4 - Comments from Yellowknives Dene First Nation



Yellowknives Dene First Nation
Box 2514, Yellowknife, N.W.T. X1A 2P8

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98 MAY 28

By Facsimile

Bob Reid, Water Resources
NWT Region, DIAND

Dear Bob

Re. Ek'ati (Lac de Gras) Watershed

INDIAN AND NORTHERN AFFAIRS - CANADA
N.W.T. REGION

JUN 01 1998

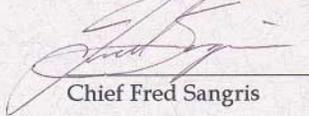
WATER RESOURCES DIVISION
100 LAKE WATERSHED UNIT

Thanks for the reminder that I had not responded to the report of our work together last summer on the Ek'ati watershed. We very much appreciated your efforts to attend to and verify our Elders' knowledge of this area. We enjoyed working with you last summer. Please accept my apologies for not responding more rapidly to the report: since becoming Chief, I have had less time to spend following up on work done while I was managing our Traditional Knowledge studies.

I did review the report when it was sent to our office and I agree that it is important to send the report to the Water Board. Along with my approval, I wish to highlight three points of the most significance to us:

- the water levels throughout that area have been dropping and may account for the change in water flow remembered by Elders: during our traditional knowledge study, this drop was demonstrated by individual Elders standing on several visible shorelines down one shore of an island in Ek'ati
- Seahorse Lake is one notable place where present-day Elders recall their grandfathers paddled on rapids on southward flows from Ek'ati
- the area south of the Echo Bay camp (where the helicopter circled so many times last summer) is another notable place where our Elders have strong memories of southward flow of water from Ek'ati: more study, especially of underground water flows, is recommended here

Thanks again, Bob, for the opportunity to work on this study. Please assure the water Board that, if they need further confirmation from our Elders, we will be happy to provide that for them.



Chief Fred Sangris

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