TRUE NORTH GEMS INC.:
Supplementary Environmental baseline sampling 2013

Background

True North Gems (TNG) is currently in the process of applying for an exploitation license at the Aappaluttoq site and has recently realized that DCE recommend that a supplementary environmental baseline studies are carried out at the site.

Inuplan have, on behalf of TNG asked the Environmental Agency for Mineral Resources Activities, Søren Hald Møller, for a detailed description of the surveys DCE recommends to be undertaken, resulting in a answer from DCE dated 27. August 2013

DCE recommends the following supplementary program to be undertaken:

- Collection of Lichens at 13 stations
- Collection of seaweed, mussels and sculpins at 8 stations
- Collection of water samples (filtered and un-filtered)
- In situ measurements of pH, Conductivity and temperature in rivers

In addition to the above DCE recommends:

- Future un-filtered water samples are analyzed for total-N and total-P
- Future filtered water samples are analyzed for phosphor (PO4) and in-organic N (NH4, NO2 og NO3).
- Water samples from Uttaaka Qaana and its outflow (st. 1 and 14) should be analyzed for chlorophyll.
- Finally, DCE recommends that so-called “all-year” water samples are collected during spring with very short intervals, hereby revealing the natural variation in the water chemistry in the area. (specific stations are mentioned)

As TNG and their partners intend to start construction of the infrastructure as soon as possible after a hopefully successful application, they have decided to initialize this supplementary baseline survey on September 9th. 2013, and hereby reducing possible delays in the project.

We have in this this field work program focused on DCE’s first 4 bullets, as we find these the most urgent, while we consider that the remaining can be collected during spring, without causing any immediate delays for TNG.

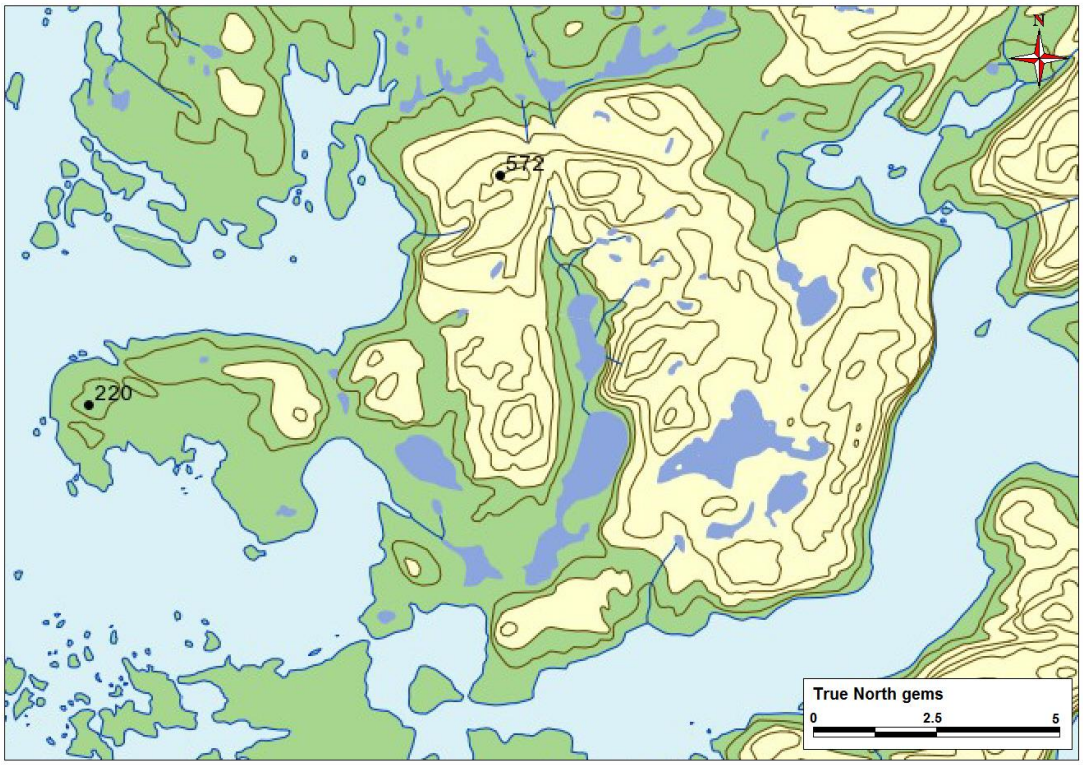

Figure 1: Overview of the project area.

Samplings:

Lichens:

DCE recommends that lichen (*C. nivialis)* samplings are undertaken at all 13 stations previous used, hereby establishing an updated baseline level for contaminants in the lichens.

The stations are shown in figure 2.

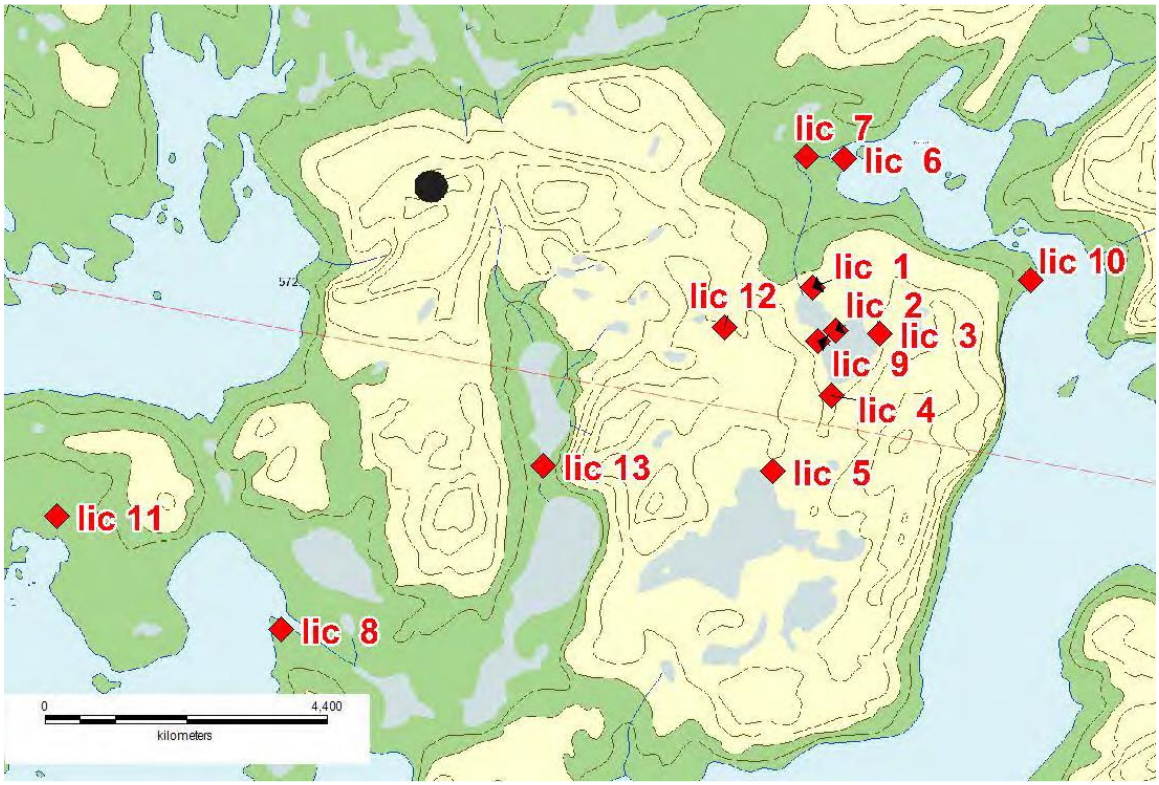

Figure 2: Sampling stations for *C. nivialis.*

Collection of seaweed, mussels and sculpins

Eight marine stations have been recommended for these samplings, see figure 3.

The survey at each marine station will entail visual habitat assessment of near shore habitat, collection of sculpins (M. Scorpius) using gillnets, collection of blue mussels (M. Edulis) and seaweed (F. vesiculosus) by skin-diving. Furthermore, at each marine station a kajak sediment sample of the bottom sediment will also be collected and the top 5 cm of the kajak-core will be stored frozen.

The following organisms plus sediment will be sampled on the station:

- A handful of the tips (new growth) of bladder wrack (Fucus vesiculosus).
- Three size groups of blue Mussel (Mytilus edulis), each containing a minimum of 20 specimens in each size group.
- The liver from 5 female Short-horn Sculpin (Myoxocephalus scorpius).
- Sediment from shallow water.

Sediment samples will be retained for subsequent laboratory analysis. The specific analytical parameters have yet to be determined.

The position of the marine stations is shown in Figure 3

All sampling will be in accordance with the DCE's sampling protocol, outlined in appendix 1.

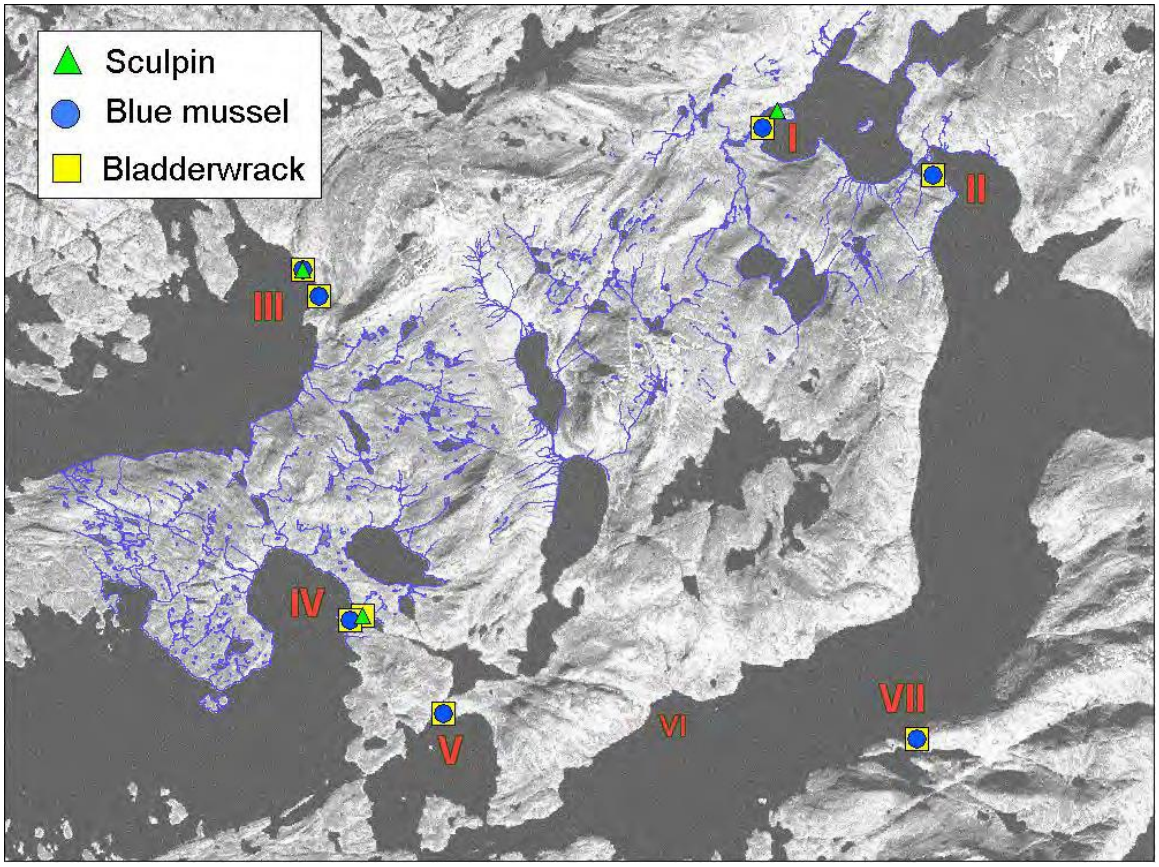

Figure 3: Overview of marine stations to be sampled.

As some of these sampling stations are situated very close to each other (within a distance of < 350 meter), we would like to propose, that station I a and b are considered as one station. The same goes for station III a and b, plus station IV a and b.

Collection of water samples (filtered and un-filtered)

We have, following discussion with Jens Søndergaard, DCE, in our selection of sampling stations for water, focused at relevant stations directly affected by the proposed activity and a reference station (14), please see the stations at figure 4.

At each riverine station one filtered and one unfiltered water sample will be collected.

Furthermore, in situ measurements of the following parameters will be made:

- pH
- Conductivity
- Temperature

Finally a sediment sample from each riverine station will be collected. A detailed description of the sampling procedure is found in appendices 1.

Figure 4 below shows the proposed water sampling stations.

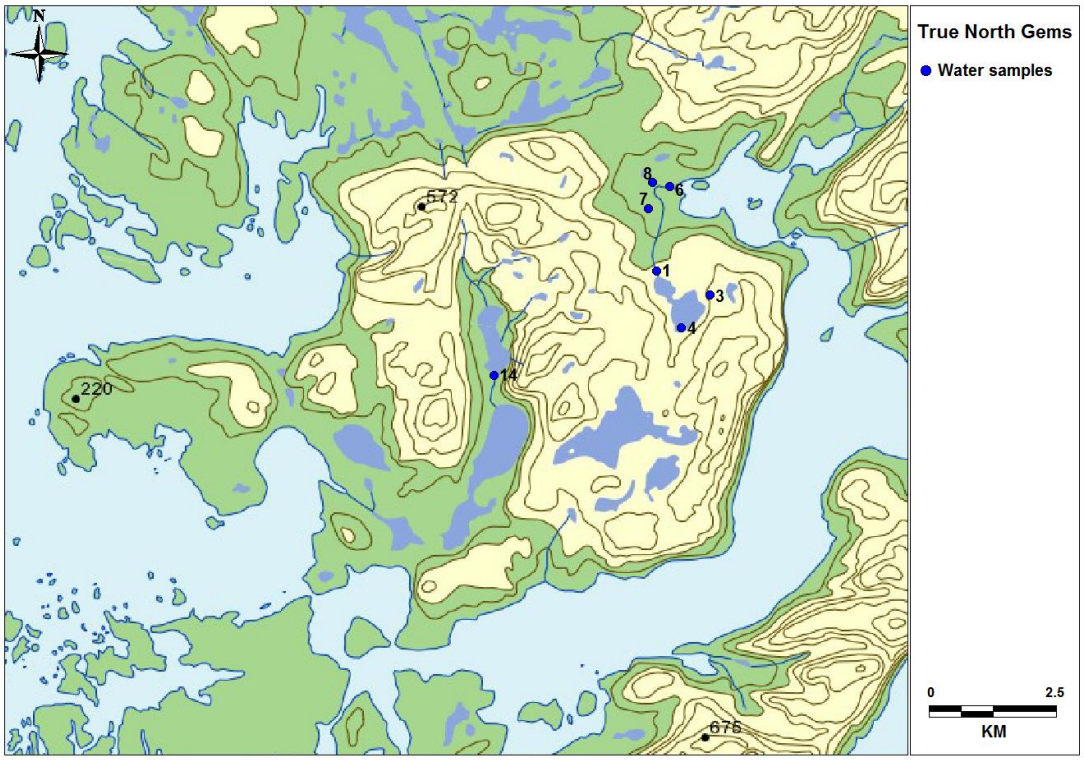

Figure 4: Proposed water sampling stations.

Additional sampling in 2013:

To gather knowledge of the presence and potential migration of arctic char within the project area, a gillnet/electrofishing survey will be conducted in the rivers potentially affected by the mining activities. The survey will determine if there is arctic char present in the area and whether these are a sedentary or an ocean migratory population. The survey will be conducted using gillnets and/or electro fishing (using CE registered and tested equipment) in the relevant rivers/lakes.

The positions of the arctic char survey are presented in figure 5 below:

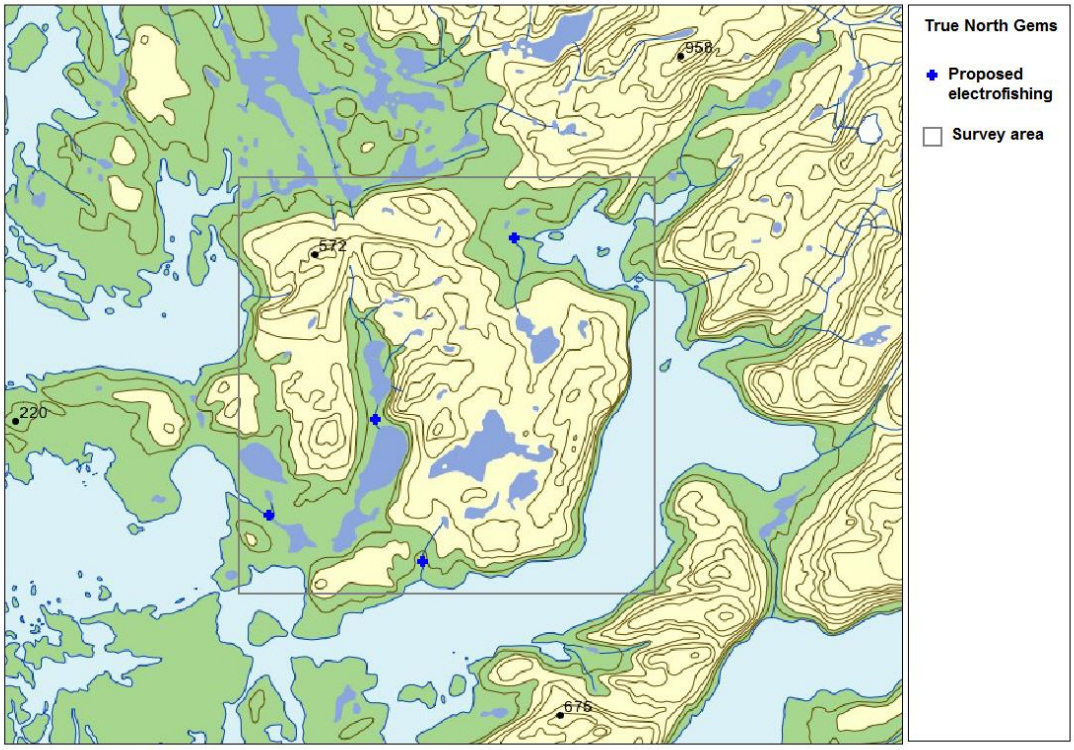

Figure 5: Proposed electrofishing stations

Finally we would like to address the remaining recommendations from DCE:

- Future un-filtered water samples are analyzed for total-N and total-P: *Will be initialized in spring 2014*

- Future filtered water samples are analyzed for phosphor (PO4) and in-organic N (NH4, NO2 og NO3).: *Will be initialized in spring 2014*

- Water samples from Uttaaka Qaana and its outflow (st. 1 and 14) should be analyzed for chlorophyll. : *Should be postponed to spring 2014*

- Finally DCE recommends that so-called "all-year" water samples are collected during spring with very short intervals, hereby revealing the natural variation in the water chemistry in the area. (specific stations are mentioned): *Will be initialized early spring 2014*

We hope BMP/DCE agrees with the above, but if this is not the case, please advise us a.s.a.p., allowing us to start this supplementary survey on Monday the 9th. of September.

General Field Survey Protocols

All survey locations and important findings will be marked in the field using GPS. Sufficient photographs will be taken at each survey point to document the general appearance and condition of the habitat and ecological parameters at the survey sites. All appropriate safety precautions will be taken while working at remote locations. One member of the field team will act as safety officer during the field work to ensure safe work and transport practices are followed. Appropriate PPE will be worn while conducting in-water work.

Field Team

The field team will include three persons:

- Lars Brünner (Biologist), Maks Klaustrup (Biologist and commercial diver) and Michael Topsoe-Jensen (Field assistant)

Field personnel will be accommodated at the TNG camp and transport to sample sites will be accomplished on foot or by helicopter.

During the field work observations wild life including birds will be registered and an GPS positions will be locked.

At the end of each day collected samples will be processed and stored frozen. Data collected during the day will be entered and secured on a PC and backup will be made on a USB-stick.

Appendix 1 – DCE sampling protocol

The following samples protocols for collected species will be adopted:

1. **Seaweed** - samples of 1-2 kg is collected of Bladder Wrack and stored in a plastic bag. Within a day or two the tip of the algae is cut off with plastic scissors, washed three time is freshwater (for a couple of minutes each time), stored in a plastic bag and frozen.

2. **Marine mussels –** samples of Blue Mussel from three size classes will be sampled: 20-40 mussels 2-3 cm long, 20-40 mussels 4-5 cm long and 20 mussels 6-7 cm long. The soft parts will be separated from the shell following NERI approved cutting and bagging techniques and frozen.

3. **Marine Fish** – the length and weight will be measured. The liver will be collected and stored frozen individual in plastic bags for later analysis.

4. **Freshwater** – 2 samples of app. 14 ml. one filtered and one unfiltered will be collected at each station. The water will be stored un-frozen for later analysis.

5. **Freshwater and marine sediment -** will be collected using a kajak-tube sampler.

6. **Lichens** – one sample consists of a handful of lichens collected from 4-5 places as close to the point as possible. The lichens will be stored and dried in a paper bag.

All samples to be frozen will be processed and frozen immediately after returning to the TNG camp by the end of each day. When the field study is completed the samples will be transported to Denmark and stored at DCE.