6. DESCRIPTION OF THE ENVIRONMENT

Environmental conditions at CAM-3 were documented by UMA (1991) and UMA and ESG (2000-2001). Those environmental components potentially impacted by, or influencing cleanup operations are summarized below. Detailed descriptions of the biophysical environment are given in UMA (1991).

6.1 Climate

In total, approximately 144.5 mm of precipitation occurs per year at the CAM-3 site, of which 79.9 mm is rainfall and 64.6 cm is snowfall. The maximum recorded amount of rain and snow received in a 24 hour period is 23.6 mm in August and 17.8 cm in April. Generally, July through October are the wettest months.

The mean daily temperature ranges from 7.5 C in July to -36.6 C in February, with a mean annual temperature of -16.1 C. Winds are primarily from the northwest, with an average wind speed of 16.1 km/hr.

6.2 Hydrology

Terrain in the vicinity of the CAM-3 site is undulating to nearly flat. The area is characterized by beaded drainage which features shallow circular to semi-circular thermokarst lakes, pools, and bogs connected by short, poorly defined drainage channels. A variety of isolated water bodies and bogs are also scattered throughout the poorly drained, low-lying areas.

The CAM-3 site sits on a ridge approximately 10 km east-northeast of Shepherd Bay. Surface drainage around the station flows semi-radially off the ridge outward to the west, south and east. Surface water drains in short, poorly defined channels, which connect many of the ponds or have breached the ridges.

The summer water supply lake is located approximately 2.4 km north-northeast of the station, while the winter water supply lake is located approximately 5.2 km east-northeast of the station.

6.3 Geology

The CAM-3 area is just west of the western extent of the Canadian Shield on the Boothia Peninsula. The site area is well covered with a surficial veneer or blanket of glacial drift, subsequently reworked by marine waters. Approximately 10 to 20 percent of the land surface in the region is covered by water. Most of the terrain is low-lying, with a relatively high, flat-top in the vicinity of the main station area. The high, flat-topped area at the station is characterized by shallow dolomite bedrock.

Numerous, small, shallow thaw ponds and lakes are present throughout the site. Drainage channels and patterns are poorly developed, but drainage is generally west to Shepherd Bay. Surficial materials are sand, gravel, and cobble-sized rubble with a variable silt and clay content, largely derived from the underlying dolomite bedrock. Isolated beach ridges, mostly obliterated by active frost processes are present throughout the area. A veneer of organic-rich muds or silts is often present in low, wet areas. The coast and active beach is comprised of poorly graded gravel and cobbles with variable sand and silt content.

The station is located on a bedrock-controlled U-shaped ridge that rises slightly above the surrounding topography. In general, the regional topography is subdued, with no bedrock outcropping. The terrain is characterized by low-lying tundra and slightly elevated former beach ridges. Within the ridges, sediment type varies from sand to cobble-sized rubble, with an increased quantity of coarse materials. Sediment is derived primarily from the limestone and dolostone bedrock in the area. The soil and sediment in the low-tundra area are typically fine sand and silt, with an overlying mat. Poorly developed frost features are present in some low-tundra areas.

Regionally, the landscape is characterized by a surficial veneer or blanket of glacial drift, subsequently reworked by marine waters. The terrain is mostly low-lying and subdued; however, a

comparatively high flat-topped plateau occupies the eastern part of the map sheet. Numerous water ponds or thaw lakes occur throughout. The ponds are generally small and are irregular to sub-circular in outline and of shallow depth. Isolated beach ridges, mostly obliterated by the active frost processes are scattered throughout the landscape. Drainage channels and patterns are poorly developed throughout the area, with drainage directed westward toward the ocean.

Surface materials consist mostly of sand, gravel and cobble sized rubble with a variable silt and clay content. The surface materials are derived largely from the underlying bedrock which consists mostly of dolostone. The surface materials are often veneered by organic-rich muds or silts, particularly within areas of standing water or water saturated surface materials. The coastal area and specifically the active beach region is comprised of well sorted gravel and cobble sized fragments with variable sand and silt content.

6.4 Flora

Except in disturbed areas, vegetation in the area is nearly continuous, consisting of willow, sedge and forbs (flowering herbs) such as mountain aven and Arctic poppy on the ridges, and cotton grass, willow, sedges and moss in the low-lying areas. The sewage outfall is particularly lush, characterized by grasses, sedges and *Scenecio congestus*. The following table summarizes the types of vegetation found at the site.

Table 6.1: Summary of Flora at CAM-3

Common Name	Scientific Name
Arctic Willow	*Salix arctica*
Sedge	*Carex spp.*
Cotton grass	*Eriophorum spp.*
Mountain avens	*Dryas octopetala*
Saxifrage	*Saxifraga spp.*
Arctic Poppy	*Papaver radicatum*
Lousewort	*Pedicularis spp.*
Polar grass	*Arctagrostis latifolia*
Swamp ragwort	*Senecio congestus*
Crazyweed	*Oxytropus spp.*

6.5 Fauna

6.5.1 Terrestrial Mammals

The following table summarizes the terrestrial fauna identified and observed at the CAM-3 site:

Table 6.2: Summary of Terrestrial Fauna at CAM-3

Common Name	Scientific Name	Comments
Barren Ground Caribou	*Rangifer tarandus greonlandicus*	Observed grazing at the station. Calving occurs in early June.
Polar Bear	*Ursus maritimus*	Animals can be found during winter on the land-fast ice along the Franklin Strait and Bellot Strait. Polar bears have been historically reported at this station but this is apparently rare.
Grizzly Bear	*Ursus arctos horribilis*	Known to exist in this region but there were not reports of sightings at Shepherd Bay.
Arctic Wolf	*Canis lupus*	Observed in the station vicinity on two occasions during the 2000 season (RRMC 2001).
Arctic Fox	*Alopex logopus*	Frequently sighted around the station. There are known dens in the area. These animals are attracted to artificial food sources (litter and landfill). Observed on 3 occasions in 2001.
Arctic Hare	*Lepus arcticus anderson*	Evidence of hares were found at the site but no individuals were observed.
Arctic Ground Squirrel	*Spermophilus parryii*	Numerous sightings in and around the site.
Collared Lemmings	*Dicrostonyx torquatus kilangmiutak*	Evidence of lemmings was seen at the site, but none were observed.

6.5.2 Marine Mammals

The following table describes the marine mammals either identified at the site, or that have known migration routes or habitat in the area.

Table 6.3: Summary of Marine Mammals at CAM-3

Common Name	Scientific Name	Comments
Beluga Whales	*Delphinapterus leucas*	Belugas and narwhals migrate westward through Lancaster Sound into Parry Cannel from Baffin Bay after ice-break-up in the spring (June-July). Preferred summer habitats and areas of major concentrations of beluga and narwhal area north of the study area. The endangered bowhead whale migrates into Lancaster Sound in June and July. It is unlikely to be encountered in the study area, preferring, like the narwhal, the fiords of northern Baffin Island during the summer.
Narwhal Whales	*Monodon monoceros*	
Bowhead Whale	*Balaena mysticetus*	
Walrus	*Odobenus rosmarus*	During the open water season (summer) walrus concentrate in Lancaster Sound in the vicinity of southwest Devon Island. Walrus are unlikely to be seen in and around Shepherd Bay since only periodic migrations are made south of Somerset Island.
Ringed Seals	*Phoca hispida*	Ringed seals summer throughout the central Arctic including Victoria Strait and Queen Maud Gulf. As many as 130,000 harp seals enter Lancaster Sound during June and July. Migration routes and summering areas of harp seals are similar to those of narwhal and, therefore, it is unlikely that significant numbers of harp seals would be seen in the vicinity of Shepherd Bay.

6.5.3 Birds

The following table summarizes the birds identified at the CAM-3 site.

Table 6.4: Summary of Avifauna at CAM-3

Common Name	Scientific Name	Comments
Snowy Owl	*Nyctea scandiaca*	There were at least three pairs of Snowy Owls observed at the site, with one confirmed nest site.
Peregrine Falcon	*Falco peregrinus*	An adult peregrine falcon was spotted at the nesting at the site, with young, in 2000.
Rough-legged Hawk	*Buteo lagopus*	A rough-legged hawk, with young, had taken over the peregrine falcon nest in 2001.
Gyrfalcon	*Falco rusticolus*	Both birds are known to occur in the region, but were not observed during either the 2000 or 2001 site visits.
Golden Eagle	*Aquila chrysaetos*	
Pacific Loon	*Gavia pacifica*	A pair of Pacific loons were thought to be nesting on a lake

Common Name	Scientific Name	Comments
		near the airstrip and other single individuals were observed in the area.
Canada Goose	*Branta Canadensis hutchinsii*	Reported to use Shepherd Bay as an important area for staging, but site visits revealed nesting density to be low.
King Eider	*Somateria spectabilis*	Six females were observed at the site.
Oldsquaw	*Clangula hyemalis*	Flocks of 3-20 birds were observed at the site.
Tundra Swan	*Cygnus columbianus*	Frequent the site.
White-fronted Goose	*Anser albifrons*	Three broods were found near the water supply lake.
Snow Bunting	*Plectrophenaz nivalis*	Found in disturbed areas around the station and appeared to be nesting at the site.
Rock Ptarmigan	*Lagopus mutus*	Common throughout the site. Five sightings of 1-3 birds and two broods of 6 were reported during the site visit.
Glaucous Gull	*Larus hyperboreus*	Common and frequently observed along the beach and at the landfills.
Raven	*Corvus corax*	
Parasitic Jaeger	*Stercorarius parasiticus*	All three species of jaeger were found at the site and were relatively common.
Pomarine Jaeger	*Stercorarius pomarinus*	
Long-tailed Jaeger	*Stercorarius lonicaudus*	
Semipalmated Sandpiper	*Calidris pusilla*	Common shorebirds at Shepherd Bay.
Baird's Sandpiper	*Calidris bairdii*	
Lapland Longspur	*Calngula hyemalis*	
Lesser Golden Plover	*Pluvialis dominica*	
Semipalmated Plover	*Charadrius semipalmatus*	
Ruddy Turnstone	*Iarenaris imterpres*	
Red Phalarope	*Phalaropus fulicarius*	

6.5.4 Fish

The following table provides a summary of the fish species known to occur in the region.

Table 6.5: Summary of Fish at CAM-3

Common Name	Scientific Name	Comments
Anadromous arctic char	*Salvelinus alpinus*	A domestic fishery for Anadromous arctic char is used by residents of Taloyoak. Also caught by Inuit, domestic fisherman for family consumption.
Arctic Cisco	*Coregonos autumnalis*	Arctic cisco and Arctic Cod are caught by Inuit, domestic fishermen for consumption by their families.
Arctic Cod	*Boreogadus saida*	

6.6 Heritage Resources

No previously recorded sites occur within the area of the CAM-3 station. Three prehistoric sites were identified during the 1990 field reconnaissance. All of the sites, containing tent rings and caches, appear to be of Thule age. One of the sites was previously disturbed severely by gravel extraction and probably looting activities. The remaining two are located in close proximity to existing roads and may be impacted during construction without the implementation of proper mitigative measures.

The area of Shepherd Bay contains significant archaeological remains. The general region is considered to be of high archaeological potential.

6.7 Socio-Economic Setting

The nearest community to CAM-3 with a full range of commercial and public services is Cambridge Bay, approximately 440 km west of the site. Generally, access to CAM-3 is limited to charter aircraft. The site can also be accessed by barge, usually around the middle of September. The community of Taloyoak (formerly Spence Bay) is 60 km north of CAM-3.

It is expected that, for the short term in particular communities and the longer term (i.e., approximately 20 years), a significant number of person-years of employment will be generated as a result of this project. Additionally, further enhancement of the areas' economy is expected resulting from increased local purchases and use of local businesses. Optimization of Inuit involvement in

the clean up is included in the agreement between NTI and DND regarding economic benefits to Inuit. A copy of the agreement is in Appendix III.

6.8 Native Land Use

The waters adjacent to this site are major seal and bird hunting areas during the spring and summer for Inuit from Gjoa Haven, located 100 km west, across Rae Strait. Arctic fox are also trapped in the vicinity of the Shepherd Bay site.

6.9 Government Land Use

The DEW Line radar/communication facilities at this site were decommissioned and replaced by a Long Range Radar (LRR) in the early 1990s. The CAM-3 site operates as an un-manned LRR, with the exception of regular maintenance checks during the year.

6.10 Valued Ecosystem Components

Valued Ecosystem Components (VEC's) are selected as components of the environment that are valued by society and are used as the basis of the environmental assessment. Potential environmental concerns associated with the project were identified through consultations with interested and expert parties, community meetings and previous project experience. The VEC's are detailed in the following sections.

Physical: Protection of permafrost soils; and, surface water, particularly related to the drinking water supply.

Biological: Tundra habitat including feeding and nesting areas for birds; feeding areas for herbivores; feeding and calving areas for local wildlife; and, local vegetation.

Socio-economic: Regional employment opportunities; regional business opportunities; regional training opportunities; and, hunting and fishing in local area.

Archaeological, Historical and Cultural: Archaeological sites identified around the station.