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**Subject:** Heart Lake  
**Importance:** High



Prop2.doc (74 KB)

Heidi

Also to follow up on your Yellowknife meeting with us, I attach the write up we did (minus photos - but they are listed) on the Heart Lake area of interest titled Concept Plan for the Proposed Heart Lake Protected Area. I hope this report and the references and literature lists also assists you in the work of identifying conservation areas. Please also pass this along to Paul your Land Use Planner Regards Bill William (Bill) Carpenter  
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## **Concept Plan for the Proposed Heart Lake Protected Area**

*(Slide 2 - Oblique Aerial of Heart Lake Lowlands)*

Prepared for:  
Ka'A'Gee Tu First Nation  
Kakisa, NWT

By:  
World Wildlife Fund  
Endangered Spaces Campaign

March 2000

## **INTRODUCTION:**

Heart Lake is a potential protected area site, located 18 km southwest of Great Slave Lake, and about 45 kilometres southeast of Kakisa along the Mackenzie Highway (see Figure 1) . The Ka'A'Gee Tu First Nation leads on the land summer camps around Kakisa for youth to become aware of their history and relationship to the land. Heart Lake also has a strong history of scientific study. The University of Alberta used Heart Lake as a zoology and botany research site in the 1960s and 1970s. The primary purpose of protecting this area is to provide a site for youth, elders and scientists to learn about the unique characteristics and heritage of the area using traditional knowledge and science skills and to conserve the unique scientific features of the area. Heart Lake has good road access and facilities that could be renovated and developed into a regional learning centre for the Deh Cho communities.

Figure 1 - Location of Heart Lake Area of Interest

*(Map insertion)*

## **PURPOSE OF THE PROPOSAL**

The intention of this proposal is to provide the Ka'A'Gee Tu First Nation with a summary of the documented information about the site and options for the advancement of Heart Lake as a protected area using the suggested steps in the NWT Protected Areas Strategy.

## **BACKGROUND**

1. Dr. Stephen S. Talbot who had studied the vegetation of the Heart Lake area for his Ph. D. thesis in 1982 proposed the concept of a Heart Lake protected area to Bill Carpenter in the spring of 1999.
2. Chief Lloyd Chicot outlined his interest in a site for a youth learning centre to link both traditional knowledge from elders and western scientific knowledge and skills. In early March 2000, Chief Chicot gave his approval for advancement of the concept of a Heart Lake protected area as a site that would be considered by the Ka'A'Gee Tu First Nation once a written proposal was completed for the community by WWF.
3. This written proposal will focus on how the Heart Lake Area meets the goals of the PAS and meets the Ka'A'Gee Tu First Nation's needs and interests in a site for a youth field camp for traditional knowledge and science learning.
4. The Heart Lake proposal primarily meets Goal 1 b. of the PAS:  
"GOAL: To protect special natural and cultural areas.  
b. Special natural areas could include unique or significant wildlife habitats, harvesting areas, sites of special cultural value, prime recreational and scenic areas and unique scientific features." (PAS 1999, p. 8)
5. Heart Lake will also contribute to Goal 2 of the PAS:  
"GOAL: To protect core representative areas within each ecoregion"(PAS 1999,p. 8)  
Heart Lake is located in the Hay River Lowlands Ecoregion.

## **CULTURAL VALUES OF THE HEART LAKE AREA**

Heart Lake and the surrounding area is of great cultural value to the Ka'A'Gee Tu First Nation, as an ancestral hunting, gathering and settlement area, and for maintaining strong cultural ties to the land by their youth. This goal for protecting the Heart Lake area meets PAS Goal 1b. for protecting areas of special cultural value.

1. The Ka'A'Gee Tu First Nation is interested in extending their on the land program to the Heart Lake area, where they would have an opportunity to combine the scientific knowledge of the area with traditional knowledge of community elders.
2. The main purpose of the current on the land program is to educate youth about their relationships with the land, water, ancestors and the Creator. Youth harvest berries, fish, trap rabbits and other small game during two week to one month camps. Youth are made aware of the health of the land by the condition of animals or other resources that are harvested and learn to respect the land, animals and traditional ways of their elders. (Chicot, personal communication).

**Figure 2 - Ka'A'Gee Tu First Nation on the land program** *(photo to be added)*

3. Youth also learn about ancestral burial sites, trails and villages, like the Tathlina Lake Settlement Area, which students reconstructed onto paper, identifying houses and the families who lived in them. This has made youth more aware of their ancestral roots and the relationship between communities in the region. (Chicot, personal communication).
4. There are currently two trap lines in the Heart Lake area being worked by Hay River community members (Chicot, personal communication).
5. Three known archeological sites are listed for the Heart Lake area, indicating pre-historic settlement and use of the area (Johanis, personal communication). Seven additional archaeological sites are identified in the vicinity of Kakisa Lake

**SPECIAL NATURAL AREA WITH UNIQUE SCIENTIFIC FEATURES**

Goal 1b) of the NWT PAS calls for the protection of special natural areas which could include unique scientific features. Heart Lake is a unique site because it has a rich diversity of landscape features, plants and types of habitats that are represented in a relatively small watershed area. The unique scientific features of Heart Lake are also well documented through the work of researchers from the University of Alberta.

### **Landscape features**

1. A variety of wetlands including raised bogs, string bogs, wooded and non-wooded fens, marl fens, lakes and streams cover much of the lowland areas.
2. Upland drier areas of Heart Lake include ancient beach ridges left from former strand lines of glacial Lake McConnell, a limestone escarpment and canyons, talus slopes and granitic erratics.
3. Ancient coral reef, lagoon and tidal flat formations from the Late Devonian period 395 to 345 million years BP appear as outcrops along the escarpment (Bellows 1993).
4. A unique feature of the Heart Lake area is the presence of alvars on the escarpment. Alvars are defined as “naturally open areas of thin soil over essentially flat limestone or marble rocks with a more or less sparse vegetation cover of shrubs and herbs with trees absent or at least not forming a continuous canopy.” (Catling and Brownell 1995). Alvars are recognized as areas of high biodiversity and often support rare and threatened plant communities (Catling and Brownell 1995).

### **Soils**

The variety of landscape features are underlain by different soil types. Three main types of soils characterize the Heart Lake area:

1. Brunisols - Thin organic layer over brown stony, gravelly or sandy loam over sandstone.
2. Rego Gleysols - characterized by periodic or permanent saturation by water. Some exhibit a peaty topsoil underlain by mottled loam.
3. Organic soils - peatland soils.

These broad categories are represented by nine soils series (APPENDIX 1 - SOILS OF HEART LAKE) which are mapped in Soils of the Upper Mackenzie River Area (Day 1968).

### **Plant species diversity**

1. Vegetation mapping and a species inventory was carried out by Dr. Stephen Talbot through his doctoral research with the University of Alberta (Talbot 1982). Dr. Talbot documented the presence of 316 species of vascular plants, 136 species of mosses and 85 species of lichen at Heart Lake (APPENDIX 2 - CHECKLIST OF VASCULAR PLANTS, MOSSES AND LICHENS OF HEART LAKE).
2. The species inventory study carried out by Talbot yielded first time records for two plant species (*Rhynchospora alba* - White beak-rush and *Eleocharis compressa* - Spike-

rush sp.) in continental Northwest Territories and extensions in the ranges of 19 species within the District of Mackenzie (Cody and Talbot 1978).

3. Heart Lake contains 28% of the total flora species for the continental Northwest Territories (Cody and Talbot 1978). The wide array of species and habitats at the Heart Lake site provides a good sample of middle boreal flora within a relatively small area.
4. Twenty three rare species of flora have been identified by Fuller and Talbot (1976) at the Heart Lake site (APPENDIX 3 - RARE AND DISJUNCT SPECIES AT HEART LAKE). This includes four species of arctic-alpine mosses rare for the District of Mackenzie. They are associated with the cold canyons of the escarpment which provide an arctic habitat in an otherwise boreal region (Talbot 1982).

### **Habitat Diversity**

The following habitat descriptions are adapted from Talbot (1982) and outline the key plant community types (by dominant species) and their association with the landscape features of Heart Lake.

#### **1. Talus slopes**

Found below the escarpment on a 30° slope. They consist of limestone debris and have sparse vegetation cover of mosses and lichens.

Cypress pigtail moss - (? moss)

*Hypnum cuppresiforme* - *Grimmia apocarpa*

**Figure 3 - Talus slope formed by breaking off of limestone escarpment**  
(Insert Slide 5)

#### **2. Upland heaths**

Low shrubby vegetation on shallow well-drained soils over calcareous bedrock are found primarily above the escarpment on the east side of the Mackenzie Highway.

Kinnikinnik (bearberry) - Cut-leaved anemone - Ragwort sp.

*Arctostaphylos uva-ursi* - *Anemone multifida* - *Senecio cymbalaroides*

**Figure 4 - Heath vegetation on thin soils of escarpment**  
(insert Slide 7)

Two sub groups of plant communities exist in these areas:

- a. Open, subarctic heath of evergreen dwarf shrubs

Creeping juniper - Kinnikinnik - Brown pixie cup (club lichen)

*Juniperus horizontalis* - *Arctostaphylos uva-ursi* - *Cladonia pyxidata*

- b. Very dry, open shrublands with few trees

Trembling aspen - Common juniper - Slender-stemmed hair moss

*Populus tremuloides* - *Juniperus communis* - *Ditrichum flexicaule*

### 3. Upland Pine woodlands

These upland Jack pine woods are found on deep, well drained soils with rich species diversity.

Jack pine - Kinnikinnik - Club lichens

*Pinus banksiana* - *Arctostaphylos uva-ursi* - *Cladonia*

#### Figure 5 - Jack pine woodlands on ancient beach ridges

(Insert Slide 11)

Four subclasses of plant communities are found in these areas:

Plateau-like uplands on rapidly drained soils over calcareous bedrock

Jack pine - Common juniper - Kinnikinnik

*Pinus banksiana* - *Juniperus communis* - *Arctostaphylos uva-ursi*

- a. Seral community recovering from the effects of extensive fire in the eastern part of the Heart Lake area in early 1950s.

Jack pine - Prickly rose - Slender-stemmed hair moss

*Pinus banksiana* - *Rosa acicularis* - *Ditrichum flexicaule*

- b. Well-drained beach deposits from Glacial Lake McConnell with sparse tree cover

Jack Pine - Kinnikinnik - Bog cranberry

*Pinus banksiana* - *Arctostaphylos uva-ursi* - *Vaccinium vitis-idaea*

- c. North-facing colluvium below escarpment

White spruce - Paper birch - Stair-step moss - Red-stemmed feathermoss

*Picea glauca* - *Betula papyrifera* - *Hylocomium splendens* - *Pleurozium schreberi*

### 4. Upland aspen-cottonwood forests

These forests of trembling aspen and balsam poplar border wetland areas and occur on beach deposits and well-drained sites of debris from the escarpment.

Trembling aspen - Balsam poplar - Low bush-cranberry

*Populus tremuloides* - *Populus balsamifera* - *Viburnum edule*

#### Figure 6 - Aspen-cottonwood forest

(Insert Slide 17)

### 5. Upland white spruce forest

The white spruce forests with feathermoss ground cover are found at a variety of sites which include forests and more open woodlands.

White spruce - Red-stemmed feathermoss

*Picea glauca* (*P. mariana*) - *Hylocomium splendens*

Three subclasses of plant communities are found in these areas:

- a. North-facing sandy beach ridge and closed depressions in plateau-like upland



Trembling aspen - River alder - Red-stemmed feathermoss  
*Populus tremuloides (Picea) - Alnus crispa - Hylocomium splendens*

- b. Plateau-like upland closed depression and below escarpment on alluvium along Heart Lake Creek

White spruce - Red-stemmed feathermoss - Wiry fern moss  
*Picea glauca - Hylocomium splendens - Thuidium abietum*

- c. Deep escarpment canyon with oldest plant community at 264 years.

White spruce - Bishop's cap - Red-stemmed feathermoss - Knite's plume (moss)  
*Picea glauca - Mitella nuda - Hylocomium splendens - Ptilium crista-castrensis*

**Figure 7 - Deep escarpment canyons support some of the oldest forests in the Heart Lake Area where they are protected from fire.**

*(Insert Slide 18)*

## **5. Woodland muskeg**

The organic terrain, dominated by black spruce and Sphagnum in the southern part of Heart Lake supports two very interesting wetland types, raised bogs and string bogs, also called aapamires.

Black spruce - Northern Labrador tea - Rusty peat moss  
*Picea mariana - Ledum decumbens - Spahgnum fuscum*

- a. Raised ombotrophic peat plateaus at margin of Heart Lake and in old lake beds. These frozen peat deposits area raised one or two metres above surrounding nutrient rich fen deposits, forming a hummocky terrain. Ombotrophic means they are dependent on precipitation for water and nutrients.

Black spruce - Northern Labrador tea - Rusty peat moss  
*Picea mariana - Ledum decumbens - Spahgnum fuscum*

**Figure 8 - Raised bog marked with treeless meltout depressions**

*(Insert Slide 21)*

- b. Aapamire strangs or String Bogs

Black spruce - Tamarack - Bog birch - Rusty peat moss  
*Picea mariana - Larix laricina - Betula glandulosa - Sphagnum fuscum*

**Figure 9 - Net fens or aapamires.**

*(Insert Slide 24)*

## **7. Boreal sedge-brown moss fens.**

These fens occur on poorly drained lacustrine (lake deposits) forming a hummocky terrain with rich species diversity.

Black spruce - Shrubby cinquefoil - Golden fuzzy fen moss - Yellow star moss  
*Picea mariana* - *Potentilla fruticosa* - *Tomenthypnum nitens* - *Campylium stellatum*

**Figure 10 - The beautiful sparrowegg lady's slipper orchid are often found in black spruce swamps.**

(Insert Slide 27)

Three sub classes of these fens occur from structurally diverse to simple.

- a. Open, wooded fens south of Mackenzie Highway and extensively below escarpment.

Black spruce - tamarack - Bog cranberry - Golden fuzzy fen moss  
*Picea mariana* - *Larix laricina* - *Vaccinium vitis-idaea* - *Tomenthypnum nitens*

- b. Very open wooded fens on wetter sites

Black spruce - Shrubby cinquefoil - Hair-like sedge - Yellow star moss  
*Picea mariana* - *Larix laricina* - *Carex capillaris* - *Campylium stellatum*

- c. Patterned string fens and on islands in marl fens exclusively below escarpment

Kalm's lobelia - Tufted bulrush - Yellow star moss  
*Lobelia kalmii* - *Scirpus caespitosus* - *Campylium stellatum*

**Figure 11 - Patterned string fens below the escarpment on gently sloping toe slopes.**

(Insert Slide 31)

## **8. Willow thickets**

These bog willow and red hook moss dominated areas are found on very poorly drained sites in fens along streams or in the centre of string bogs..

Bog willow - Buck bean - Red hook moss  
*Salix pedicellaris* - *Menyanthes trifoliata* - *Drepanoladus revolvens*

Two subclasses can be identified:

- a. Fens

Bog willow - Water sedge - Red hook moss  
*Salix pedicellaris* - *Carex aquatilis* - *Drepanocladus revolvens*

- b. Quaking mat changing to shrub fen and raised bog with decreasing moisture.

Found along the clear, slow-moving inlet stream to Heart Lake.  
Bog willow - Hairy-fruited sedge - Sausage moss - Red hook moss  
*Salix pedicellaris* - *Carex lasiocarpa* - *Scorpidium scorpiodes* - *Drepanocladus revolvens*

## **9. Tall sedge meadows**

These poorly drained sedge meadows are found along the Heart Lake shoreline and outlet of Heart Creek.

Hairy-fruited sedge - Labrador bedstraw - Marsh reed grass  
*Carex aquatilis* - *Galium labradoricum* - *Calamagrostis canadensis*

Two subclasses are identified:

a. Deciduous thicket located at outlet of Heart Lake, occasionally flooded in spring.  
Flat-leaved willow - Hairy-fruited sedge - Golden ragged moss  
*Salix planifolia* - *Carex aquatilis* - *Brachytecium salebrosum*

b. Floating mats of sedges, grasses and rushes partially encircling Heart Lake.  
forming an ecotone between open water and raised bog.  
Hairy-fruited sedge - Beaked sedge - Marsh cinquefoil  
*Carex aquatilis* - *Carex rostrata* - *Potentilla palustris*  
C. rostrata is a rare species of sedge found in floating fens.  
P. palustris is the only Potentilla with purple petals. Flowers give off a fetid odour that attracts carrion-feeding insects as pollinators (Johnson et. al. 1995)

#### **10. Marl fens below escarpment**

This wetland type has the appearance of wet concrete, as marl is a deposit of calcium carbonate mixed with clay and other material.

Few-flowered spike-rush - Flatstem spike-rush - Tall cotton-grass  
*Eleocharis pauciflora* - *Eleocharis compressa* - *Eriophorum angustifolium*

#### **Figure 12 - Aerial view of a marl fen below the escarpment.**

(Insert Slide 32)

### **WILDLIFE AND WILDLIFE HABITAT VALUE OF HEART LAKE**

The habitat diversity of Heart Lake provides a rich supply of food sources and shelter for wildlife such as moose, woodland caribou, lynx, forest and aquatic furbearers, small mammals, waterfowl and songbirds. Detailed information on actual habitat use and wildlife abundance is not available for large mammals and waterfowl for the Heart Lake site, but small mammal studies and two studies of breeding songbirds were undertaken at the site.

#### **Figure 13 - The heaths are prime nesting habitat for the common nighthawk**

(Insert Slide 9)

## Mammals

- Extensive studies (APPENDIX 4 - STUDIES OF MAMMALS AT HEART LAKE, NWT) on small mammal biology were carried out in this area through the University of Alberta Biological Research Station, providing detailed information on the following species:
  - Population ecology of deer mice *Peromyscus maniculatus*, and two species of red-backed voles, *Clethrionomys gapperi* and *Clethrionomys rutilus*.
  - Ecology of the Red Squirrel, *Tamiasciurus hudsonicus*.
  - Population ecology of the Little Northern Chipmunk, *Eutamias minimus borealis*.
  - Prey selection, use of trees and winter predation by ermines, *Mustela erminea*.
  - Biology of lynx, *Felis canadensis*.
- No detailed studies of large mammal use of the area have been undertaken. General and very dated information about wildlife areas can be found in the Arctic Ecology Map Series at a scale of 1:1,000,000 (CWS 1965). Map sheet 2114 which includes Heart Lake identifies the shoreline area of Great Slave Lake as a fall staging area for Canada Geese, Canvasbacks and other ducks. The Map sheet also identifies the Kakisa and Laferte River systems to the north of Heart Lake as excellent beaver areas.
- Jacobsen's (1979) report on "Wildlife and Wildlife Habitat in the Great Slave and Great Bear Lake Regions" also provides only very general information about habitat values for the bog and forest zone which includes the Heart Lake area (See Table 1 below).

**Table 1 - Wildlife and Habitat Requirements**

Wildlife species	Habitat requirement
Moose	Abundant willows surrounding shallow lakes and ponds provide excellent winter range. In summer, lush aquatic vegetation.
Woodland caribou	Bog and forest, feeding on ground and arboreal lichen in winter.
Black Bear	Feed in bogs and forest.
Red fox	Concentrate in willow stands, feeding on willow ptarmigan and varying hares.
Lynx	Feeds primarily on snowshoe hares, and favours dense undercover of thickets.
Marten	Old growth coniferous and mixed woodland. Feed on red-backed voles, deer mice, varying hare, grouse, shrews and squirrels.
Weasel (Ermine)	Feed on red-backed voles, mice, shrews.
Wolverine	Feeds primarily on caribou. More common in tundra zone. Western population is identified as vulnerable (COSEWIC 2000).
Wolves	Abundant in Slave River Plain.
Aquatic furbearers	Good muskrat, mink, beaver and otter habitat.

## Birds

The Checklist for Birds of the Northwest Territories lists over 200 regular breeding, migratory and resident birds for the Mainland region which includes all continental areas east of the Liard and Mackenzie rivers, encompassing boreal and subarctic, as well as low and mid arctic ecosystems (Sirois and McRae 1994). More specific bird studies of the Heart Lake area include one study on summer breeding songbirds and one study on overwintering birds (Carbyn 1967; Carbyn 1968).

1. Carbyn (1967) found eight breeding passerine (songbird) species at his Heart Lake plot and five non-breeding and non-passerine bird species. In his winter study Carbyn (1968) identified 13 species that overwinter between Heart Lake and Rae along the Mackenzie Highway out of a total breeding population of 105. A list of species identified by Carbyn at his Heart Lake and Kakisa River plots in summer, and the overwintering birds along the Mackenzie Highway is provided in Table 2.
2. The closest Migratory Bird Terrestrial Sites identified by Canadian Wildlife Service are Mills Lake to the north, an important waterfowl staging area (which is also being proposed as a protected area) and Beaver Lake a resting and feeding site for migrant Tundra Swans and ducks in fall and spring (Alexander 1991).

**Table 2 - Documented Presence of Birds at Heart Lake and Area (Carbyn 1967;1968)**

<b>Summer</b>	<b>Overwintering Birds</b>
<b>Breeding Song birds</b>	<b>Heart Lake</b>
American Robin	Spruce Grouse
Swainson's Thrush	Great-horned Owl
Ruby-crowned Kinglet	Northern Three-toed Woodpecker
Bohemian Waxwing	Gray Jay
Tennessee Warbler	Raven
Myrtle Warbler	Boreal Chickadee
Slate-coloured Junco	Hoary Redpoll
Traill's Flycatcher (Kakisa)	
Boreal Chickadee (Kakisa)	<b>Surrounding locations</b>
Palm Warbler (Kakisa)	Sharp-tailed grouse (Kakisa River)
Lincoln's Sparrow	Ruffed Grouse (Ft. Providence)
<b>Non-breeding and non-passerine</b>	Willow Ptarmigan (Ft. Providence)
Sharp-shinned Hawk	Goshawk (Kakisa river)
Spruce Grouse	Pine Grosbeak (Ft. Providence)
Great-horned Owl	White-winged Crossbill (Rae)
Yellow-shafted flicker	
Gray Jay	
Wilson's Snipe (Kakisa)	
Northern Three-toed Woodpecker (Kakisa)	
Pine Grosbeak (Kakisa)	

**HAY RIVER LOWLANDS ECOREGION CORE REPRESENTATIVE AREA**

The Heart Lake area will meet the second Goal of the PAS by adding to core representation of the Hay River Lowlands Ecoregion. This large ecoregion is one of 42 ecoregions in the Northwest Territories. The Hay River Lowland is the broad level lowland plain drained by the Fort Nelson and Liard rivers in northeastern British Columbia, and the Hay River in northwestern Alberta, which all ultimately flow into the Mackenzie River (Ecological Stratification Working Group 1998).

1. The Hay River Lowland Ecoregion is divided into smaller geographical units - Enduring Features or NWT Landscape Units. Developed by the World Wildlife Fund, Enduring Features are based on the Soil Landscapes of Canada Ver. 2.2 and the Soil Organic Carbon Digital Database, National Soils Database at 1:1,000,000.
2. NWT Landscape Units are based on four attributes of the 1998 CanSIS 1:1,000,000 Soil Carbon Database, parent material, soil development, texture and topography. The landscape units provide a good baseline to identify areas important for biodiversity conservation and potential protected areas (PAS Supporting Document 3 1999).
3. The proposed Heart Lake area covers three Enduring Feature areas in the WWF classification. One of these enduring features is moderately represented in Wood Buffalo National Park, which does not however cover the lower lying areas on the shore of Great Slave Lake (WWF 1999).
4. A more complete gap analysis on the level of representation that would be provided by the proposed Heart Lake Area has been requested from the Protected Areas Secretariat. (Letter of request dated March 19, 2000). This will be added to the Heart Lake Proposal once received.

### **ECONOMIC AND RESOURCE DEVELOPMENT POTENTIAL**

The NWT Protected Areas Strategy requires that information on the known resource development potential of protected areas of interest be compiled in Step 1 of the planning process.

1. A letter requesting known information about mineral claims and occurrences, oil and gas licenses, and any other renewable and non-renewable resource interests, was sent to the Protected Areas Secretariat (Letter of March 19, 2000).
2. Information on other third party interests was also requested from the PAS Secretariat (Letter of March 19, 2000). Two traplines are currently being worked in the Heart Lake area of interest. The known facilities on the site are several buildings used by the University of Alberta in the 1960s and 1970s, a fire tower and some roads into the site. The Mackenzie highway runs through the Heart Lake Area of interest, and several gravel pits used for highway construction and maintenance are present along the highway corridor.

### **SURFACE AND SUBSURFACE PROTECTION FOR HEART LAKE**

Protected area designation can involve only surface protection for land, or additionally the subsurface access to development can be restricted. It is recommended that both surface and subsurface protection be pursued for Heart Lake should it be advanced as a protected area.

1. The Heart Lake area of interest is relatively small and therefore it would be difficult to maintain its ecological integrity and the landscape features if subsurface activity such as mineral exploration and oil and gas development were allowed on the site.
2. If the Heart Lake site is to be one of the representative areas for the Hay River Lowlands Ecoregion, both the surface and subsurface protection would be required under the NWT Protected Areas Strategy (PAS 2.1 c., p. 10).

### **POTENTIAL PROTECTED AREA DESIGNATIONS**

As the primary objectives of a Heart Lake Protected Area are education, preservation of species diversity, and protecting an area of cultural significance, there is no exact match with protected area mechanisms currently available in the Northwest Territories. Through the Deh Cho process, there may be an opportunity in the future to incorporate protected area mechanisms. The following designations meet some of the objectives of the proposed Heart Lake protected area and provide possible levels of protection.

#### **National Wildlife Area**

1. National Wildlife Areas (NWAs) are established to conserve nationally significant wildlife, including migratory birds and their essential habitats. They may also protect areas supporting rare plants and unusually diverse or genetically important habitats (PAS 1999, Supporting Document 1) Heart Lake would qualify under the second category of NWA, as it supports very diverse habitats within a relatively small area, and several rare species of plants.
2. NWAs are managed by the Canadian Wildlife Service, under the Canada Wildlife Act. NWAs offer a relatively flexible tool to protect an area and its wildlife, and regulations can be tailored to meet local needs. Regulations may control access to surface and/or subsurface resources.

#### **Territorial Natural Environmental Recreation Park**

1. The Territorial Natural Environmental Recreation Parks are established to provide recreation and tourism opportunities in a natural, undeveloped landscape. The focus of Territorial Parks legislation is on tourism and recreation, and environmental protection is not a primary purpose in the current categories available (PAS 1999, Supporting Document 1)

2. Heart Lake provides an undeveloped landscape, and its proximity to the Mackenzie Highway, and some facilities on site would provide potential recreation or tourism opportunities. The goal of Heart Lake however focuses primarily on education, both traditional and scientific, so this designation is not a perfect fit. Changes to the Territorial Parks Act are being explored to better reflect the goals of the NWT PAS.

In addition it may be useful to look at protected area mechanisms available outside the NWT that provide applicable management guidelines. An example is the ecological reserves. The purpose of Ecological Reserves is to protect a relatively small ecological site primarily for research and study (PAS 1999, Supporting Document 1). Use of the site is focused on the ecological monitoring and education. Heart Lake and many of the sites identified under the International Biophysical Program would fit under the criteria of an ecological reserve.

## **CONCLUSION**

Heart Lake has some very unique and positive characteristics which would make it a good candidate as a protected area using the NWT Protected Areas Strategy:

1. The Ka'A'Gee Tu First Nation of Kakisa has a vision of further developing their successful on the land program, using the Heart Lake site. Combining their traditional knowledge and skills with the scientific experience of the Heart Lake Biological Station, the Ka'A'Gee Tu First Nation could develop an innovative regional learning centre for the Deh Cho communities.
2. Heart Lake is a site of rich habitat and species diversity within a relatively small watershed area. The combination of various wetland types and the escarpment features of the site support 316 plant, 136 moss and 85 lichen species, some of which are rare for the District of Mackenzie.
3. Heart Lake is accessible for educational and research purposes as it is next to the Mackenzie Highway. The condition of the buildings on the site would need to be assessed to determine if they could be renovated for camp and educational use.
4. Heart Lake meets Goal 1 of the PAS by being a special natural and cultural area, which includes harvesting areas, sites of cultural value and unique scientific features.
5. A Heart Lake protected area would contribute to more complete representation for the Hay River Lowlands ecoregion, which is currently only partially represented by a section of Wood Buffalo National Park and potentially by Mills Lake (another proposed protected area).

## **NEXT STEPS**

1. This proposal will be reviewed by the Ka'A'Gee Tu First Nation for a decision on whether to advance Heart Lake through the Protected Areas Strategy planning process.



Information on economic, resource development and third party interests will be incorporated into the proposal once received from the PAS Secretariat. To develop a clearer understanding about the value of the Heart Lake site to the community, a workshop will take place at the request of Ka'A'Gee' Tu First Nation, facilitated by World Wildlife Fund - NWT at the end of April 2000.

2. If the Ka'A'Gee Tu First Nation decides to take no further action of the Heart Lake proposal through the PAS, further work on the site would not proceed at this time.
3. A decision to further advance the Heart Lake area through the PAS process, could lead to the following activities:
  - a) Community discussion on a *preliminary* "draft boundary" for a Heart Lake protected area.
  - b) The Ka'A'Gee Tu First Nation consulting with other communities whose Traditional Land Use overlap the area chosen as a potential Protected Area.
  - c) A presentation to the Deh Cho First Nations to gain regional support to pursue the establishment of protection for the Heart Lake area.
  - d) Ensuring that the establishment of a Protected Area for Heart Lake does not hinder the Deh Cho process nor threaten aspirations of Dene self-government and aboriginal title.
  - e) Moving towards interim protection of the area provided it does not affect current and historical traditional land use and occupation of the area.
  - f) Access to additional funding from agencies providing support to the Implementation Phase of the NWT Protected Areas Strategy.

### **ACKNOWLEDGEMENTS**

Special thanks to Chief Lloyd Chicot, Dr. Stephen Talbot and Dr. Bill Fuller for providing much of the information about Heart Lake, and for initiating the planning process for this potential protected area. The photographs of the Heart Lake area were also generously donated by Dr. Stephen Talbot. Assistance with research and proposal development was provided by Angela Stadel. The support being provided by the Protected Areas Secretariat in preparing information on known economic values of the area, third party interests and ecoregion representation is also greatly appreciated.

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**APPENDIX 1 - SOILS OF THE HEART LAKE AREA (Adapted from Day 1968)**

<b>Soil Series</b>	<b>Soil Type</b>	<b>Associated vegetation</b>
deRoche (dR)	Orthic Regosols developed on medium to moderately textured beach deposits underlain by lacustrine deposits. Well and moderately well drained.	Black spruce, white spruce, tamarack, balsam poplar, alder, dwarf birch, willow, buffalo berry, cinquefoil, juniper, alpine bearberry, sedges, mosses and bearberry.
Desmarais (De)	Rego Gleysols with peaty surface layer over stony gravelly loam. Poor drainage	Black spruce, tamarack, willow, dwarf birch, juniper, cinquefoil, mosses, lichens, bearberry and sedges.
Dory (Do)	Rego Gleysols with brown stony, gravelly, loamy surface over mottled grayish lacustrine silty clay loam. Poorly drained.	Black spruce, tamarack, willow, dwarf birch, alpine bearberry and bearberry, Labrador tea and lichens.
Enterprise (Et)	Orthic Brunisols with thin organic layer over brown stony, gravelly loam or sandy loam, over stony, gravelly loam that grades into sandstone. Well drained	Lodgepole pine, white spruce, aspen, pine seedlings, buffaloberry, willow, prickly rose, bearberry, Labrador tea, cinquefoil, lichens, mosses and grasses.
Escarpment (Es)	Orthic Brunisols with a few inches of organic material on the surface over brown gravelly loam or sandy loam over sandstone. Well drained.	Aspen and pine at low density, willow, buffalo berry, juniper, cranberry, rose, peavine, raspberry, grasses, fireweed, bearberry and lichens.
Grainger (G)	Organic soil of reddish brown peat, poorly decomposed, strongly acidic and usually frozen below 18". Little or no free water.	Moss, Labrador tea, leatherleaf, bearberry, lichens, liverworts, cloudberry, black crowberry. Few black spruce, tamarack, birch and pine trees.
Matou (Ma)	Organic soils of black peat, well or moderately well disintegrated. 12-40" thick over mineral soil and often frozen at 18' or below.	Willow, black spruce, tamarack, juniper, dwarf birch, Labrador tea, hardhack, moss, lichens, sedges and grasses.
Swede (Sw)	Rego Gleysols with 2-12" of peaty organic material on surface over mottled calcareous loamy sand or sand. Poorly drained due to impermeable deposits under permeable upper layers.	Scattered tamarack and black spruce, dwarf birch, willow, cinquefoil, Labrador tea, alpine bearberry, reindeer moss (lichen), sedge and juniper.
Twin Falls (Tf)	Orthic Brunisol and Arenic Podzo Regisol. Sandy, porous and drouthy. Rapidly drained and permeable.	Lodgepole pine, with some aspen and white spruce. Sparse groundcover of rose, lichen, grass, bearberry and few clumps of buffaloberry, high bush cranberry, juniper, fireweed and peavine.

**APPENDIX 2 - FLORA CHECKLIST FOR HEART LAKE (Talbot 1982)**

*SEE ATTACHED PAGES*

### APPENDIX 3 - RARE AND DISJUNCT SPECIES AT HEART LAKE

Common Name	Scientific Name	Status Comments
Vascular Plants		
Virginia grape fern	<i>Botrychium virginianum</i>	Rare and local in rich woodland of southwestern District of Mackenzie. <sup>1</sup>
Bladder fern sp.	<i>Cystopteris montana</i>	Rare and local mainly growing in damp calcareous places. <sup>1</sup>
Rock polypody	<i>Polypodium vulgari</i>	
Scheuchzeria (aquatic)	<i>Scheuchzeria palustris</i>	Uncommon but widely scattered circumpolar species. <sup>2</sup>
White beak-rush	<i>Rhynchospora alba</i>	Rare and widely scattered across boreal forest. Circumpolar with gaps. <sup>2*</sup>
Speckled lady's-slipper	<i>Cypripedium guttatum</i>	Rare and very localized in distribution. <sup>1</sup>
Bladder campion	<i>Melandrium ostenfeldii</i>	Endemic of North western North America.
whitlow-grass sp.	<i>Draba oligosperma</i>	Cordilleran species usually found along Liard River, Great Bear Lake and in the Mackenzie Delta. <sup>1</sup>
Arctic bladderpod	<i>Lesquerella arctica</i>	Unusual for Heart Lake as it is usually found on dry slopes and ridges in the mountains (Cody and Talbot 1978)
Pitcher plant	<i>Sarracenia purpurea</i>	Quite rare in the District of Mackenzie. <sup>1</sup>
Prairie gentian	<i>Gentiana affinis</i>	Widely disjunct from the main range south of the South Saskatchewan River. <sup>1*</sup>
Swamp lousewort	<i>Pedicularis parviflora</i>	In continental NWT only other known location is mouth of the McConnell River on the Hudson Bay coast. <sup>1*</sup>
Flatstem spike-rush	<i>Eleocharis compressa</i>	First-time record of presence in continental NWT recorded at Heart Lake. <sup>1*</sup>
Mosses and Lichens		
	<i>Andraea rupestris</i>	
	<i>Fissidens arcticus</i>	Arctic-alpine moss.
	<i>Seligeria campylopoda</i>	
	<i>Mnium blytti</i>	
	<i>Mnium riparium</i>	
	<i>Timmia norvegica</i>	
	<i>Myurella sibirica</i>	
	<i>Hypnum bridelianum</i>	
	<i>Hypnum procerrimum</i>	Arctic-alpine moss, possibly indicative of glacial refugia (Talbot 1978).
	<i>Diploschistes actinostomus</i>	

1. Plants listed in Cody's (1979) "Vascular Plants of Restricted Range in the Continental Northwest Territories, Canada."

2. Description of range from Johnson et al. (1995) "Plants of the Western Boreal Forest and Aspen Parkland."

\* Plants listed in McJannet et al. (1995) "Rare Vascular Plants in the Northwest Territories."

## APPENDIX 4 - STUDIES OF MAMMALS AT HEART LAKE, NWT

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Addendum:

#### BIRDS OF HEART LAKE AND VICINITY

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