



Keeyask Generation Project

Reservoir Clearing Plan



KEYYASK HYDROPOWER LIMITED PARTNERSHIP

RESERVOIR CLEARING PLAN

Schedule 11-1

Joint Keeyask Development Agreement

SCHEDULE 11-1

**KEYYASK HYDROPOWER LIMITED PARTNERSHIP
RESERVOIR CLEARING PLAN**

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RESERVOIR CLEARING PLAN

This **Reservoir Clearing Plan** reflects current conditions in the area of the **Keeyask Project**. Conditions can change quickly, as has been evidenced by numerous forest fires over the last decade, affecting the northeast part of the reservoir area, Caribou Island and most of the south of the **Keeyask Project**.

This **Reservoir Clearing Plan** is subject to the provisions of any license issued by a **Regulatory Authority** affecting the **Keeyask Project**, including the **Closing Licenses**, and will be modified, as necessary, in order to comply with the terms of any such license.

1. OBJECTIVES

The objectives of the **Reservoir Clearing Plan** for the **Keeyask Project** are as follows:

- (a) minimize impacts of reservoir creation and operation on the fishery by minimizing the effects of standing trees and shrubs on fishing in selected areas within the reservoir;
- (b) minimize the impacts of reservoir creation and operation on human access to shore locations by creating shore access locations through selective clearing of trees and shrubs;
- (c) minimize hazards to boating safety and fishing resulting from large floating debris by minimizing the source of such debris; and
- (d) minimize aesthetically offensive landscapes.

2. RESERVOIR CLEARING

The clearing of vegetation from the reservoir area is divided into two phases:

- (a) pre-flooding, which affects the area within the 159 meters (521.7 feet) ASL flood elevation at the dam; and
- (b) post-flooding, which includes areas that may be affected by erosion or peat land disintegration after the reservoir has been filled with water.

These two phases are discussed in greater detail and are accompanied by separate Figures 1 and 2, attached.

2.1 Pre-Flooding

Clearing of the reservoir area prior to flooding will address many of the goals for safety and environmental sustainability. Recommended clearing methods and associated activities include areas for hand clearing, areas where hand or machine clearing are suitable, and the creation of access and safe landing sites along the reservoir shoreline. Consideration is given to both wood salvage and environmentally sensitive areas that may require specific treatment during clearing operations. Flagging of clearing boundaries and on-site supervision are critical to the successful implementation of all aspects of the reservoir clearing plan (Figure 1).

2.1.1 Areas to be Cleared

The surface elevation of the reservoir up to at least 159 metres (521.7 feet) **ASL**, and some level above as a buffer, will be surveyed and staked to define the extent of area to be cleared. This area is shown on Figure 1.

2.1.2 What is to be Cleared

All standing woody material, which includes dead and living trees and shrubs 1.5 metres (5 feet) tall or taller, as well as all fallen trees 1.5 metres (5 feet) or more in length with a diameter of 15 centimeters (6 inches) or greater at its largest point will be cleared.

2.1.3 Timing of Clearing Activities

Reservoir clearing will be undertaken in the three (3) years preceding reservoir impoundment, except for areas that will be underwater as a result of coffer dam construction. These areas will be cleared prior to the flooding caused by these works.

2.1.4 Methods of Clearing

2.1.4.1 Mechanical Clearing

The preferred method of clearing is mechanical clearing by shear blading during the winter when the ground is frozen. Using this method, the cleared material is deposited in windrows or piles and left to dry. Cleared material is burned during the following winter season.

Machine clearing has the advantage of shearing stumps off at ground level, along with all other vegetation that is there. It also accumulates all of the loose and dead woody debris that is on the forest floor, along with hummocks of sphagnum moss, making for a very efficient and effective operation. Maximizing machine clearing will minimize the amount

of woody and organic debris that would remain on site and enter the water following flooding.

All areas designated for mechanical clearing on Figure 1 will be cleared using this method, with the following exceptions:

- (a) cultural or heritage sites known or discovered to exist within the areas identified for mechanical clearing will receive special treatment, as appropriate, as determined on a case by case basis;
- (b) selected mainland locations as may be designated by the **Project Manager**, where practical, for tree salvage (for use as firewood, saw-logs, cabins, etc.) will be hand cleared; and
- (c) selected locations as may be identified by the **Project Manager**, where tree and shrub density is sufficient to reduce wave energy, may not be cleared, leaving trees and shrubs standing in shallow water to provide protection to the shoreline from wave energy, thereby reducing erosion rates and providing a more stable shoreline for the new growth of riparian shrubs and trees.

2.1.4.2 Hand Clearing

The areas requiring hand clearing are approximately as shown on Figure 1. Clearing will be done using chain saws and brush cutters and other tools as may be appropriate in the circumstances.

Generally, hand clearing will take place at locations within 10 metres (33 feet) of the existing normal high water mark on the Nelson River and within 5 metres (16 feet) of tributary stream banks, due to the higher potential for disturbance of sensitive sites in these areas (for example, riparian areas and heritage sites).

In addition, hand clearing methods will be used where it is not possible to operate mechanical clearing equipment because of site location (inaccessible islands) or condition (steep slopes).

Typically, areas cleared by hand will contain stumps of trees and shrubs approximately 6 inches (15 cm) in height. In addition, most of the smaller shrubs and forest floor debris (if covered by snow) will remain on site.

The final extent of each area to be cleared using hand clearing methods will be determined in the field and will be clearly marked, within one kilometer (0.6 miles) of the area to be cleared by hand, prior to mechanical clearing taking place.

2.1.5 Landing (Access) Sites

There will be an on-going need for user access to the reservoir area from land and access to land from the reservoir for reasons of resource harvesting, recreational enjoyment or emergency purposes. A number of landing sites will be identified along the future reservoir shorelines and these sites will be cleared pursuant to the **Waterways Management Program**. Clearing at these sites may consider the removal of stumps and peat, along with the above ground vegetation, to ensure safe access/egress to the shoreline. Hand clearing will be considered at landing sites above the high water mark to minimize environmental effects and maximize recreational, aesthetic and cultural opportunities.

2.1.6 Consideration of Environmental Sensitivities/Valuable Sites

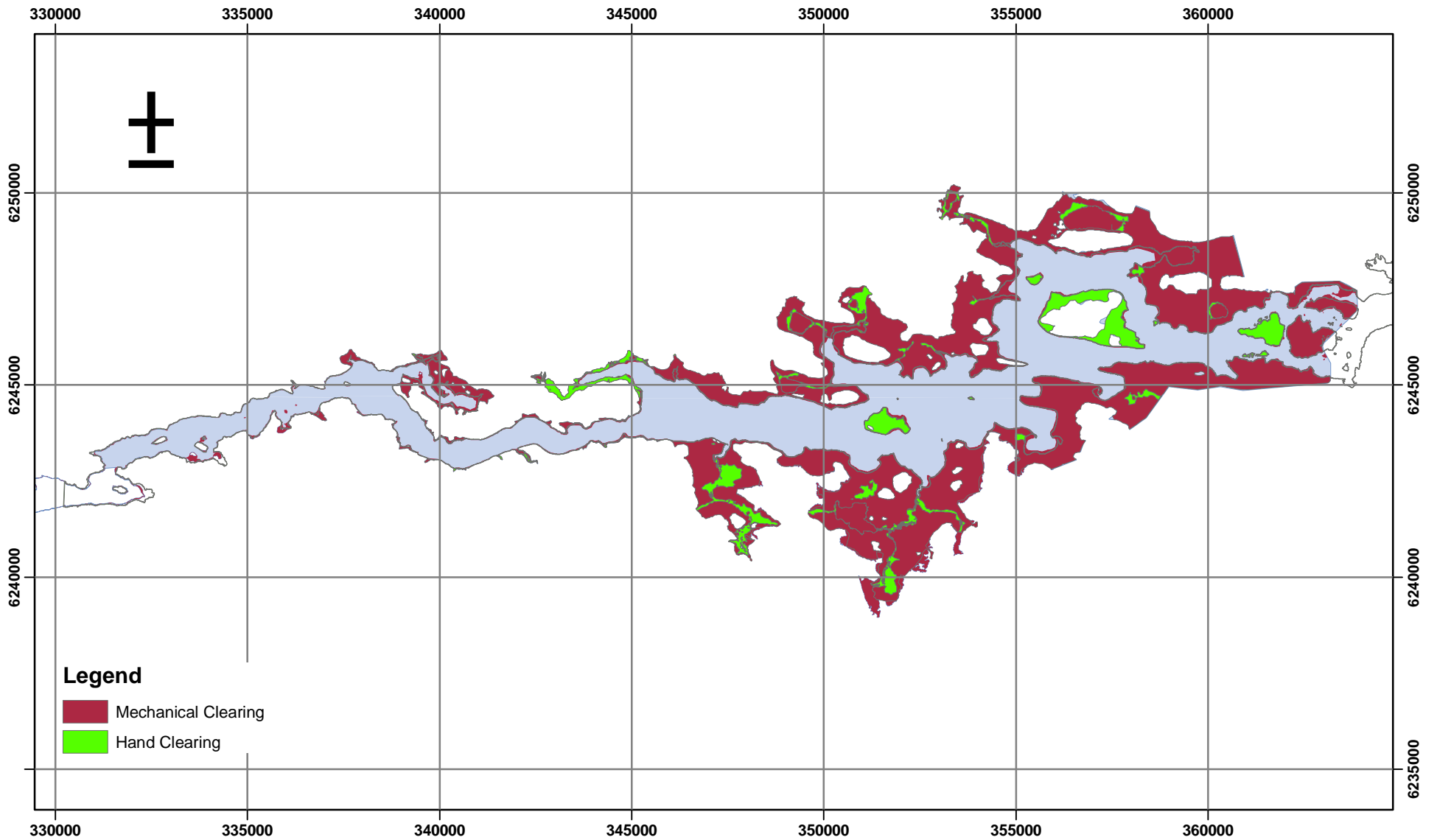
Information is still being collected and analyzed to identify very specific environmental sensitivities and environmentally valuable sites that may be managed to support the protection of the environment. It is anticipated that such sites will be relatively small in size, possibly experimental in nature and may require long-term study. Consideration of these issues will be undertaken in the environmental protection plan for the **Keeyask Project**.

2.2 Post-Flooding

Areas beyond the initial impoundment of 159 metres (521.7 feet) ASL are at risk of erosion and peat land disintegration after flooding (Figure 2). It is also anticipated that erosion and peat land disintegration will continue over a prolonged period of time after reservoir impoundment and if left unchecked has the potential to contribute substantial amounts of woody debris into the reservoir, thereby jeopardizing human safety and resulting in negative impacts to the **Keeyask Cree Nations**.

Areas that will convert from land to water over time as a result of peat land disintegration and shoreline erosion will be cleared on an ongoing basis through the implementation of the **Waterways Management Program**.

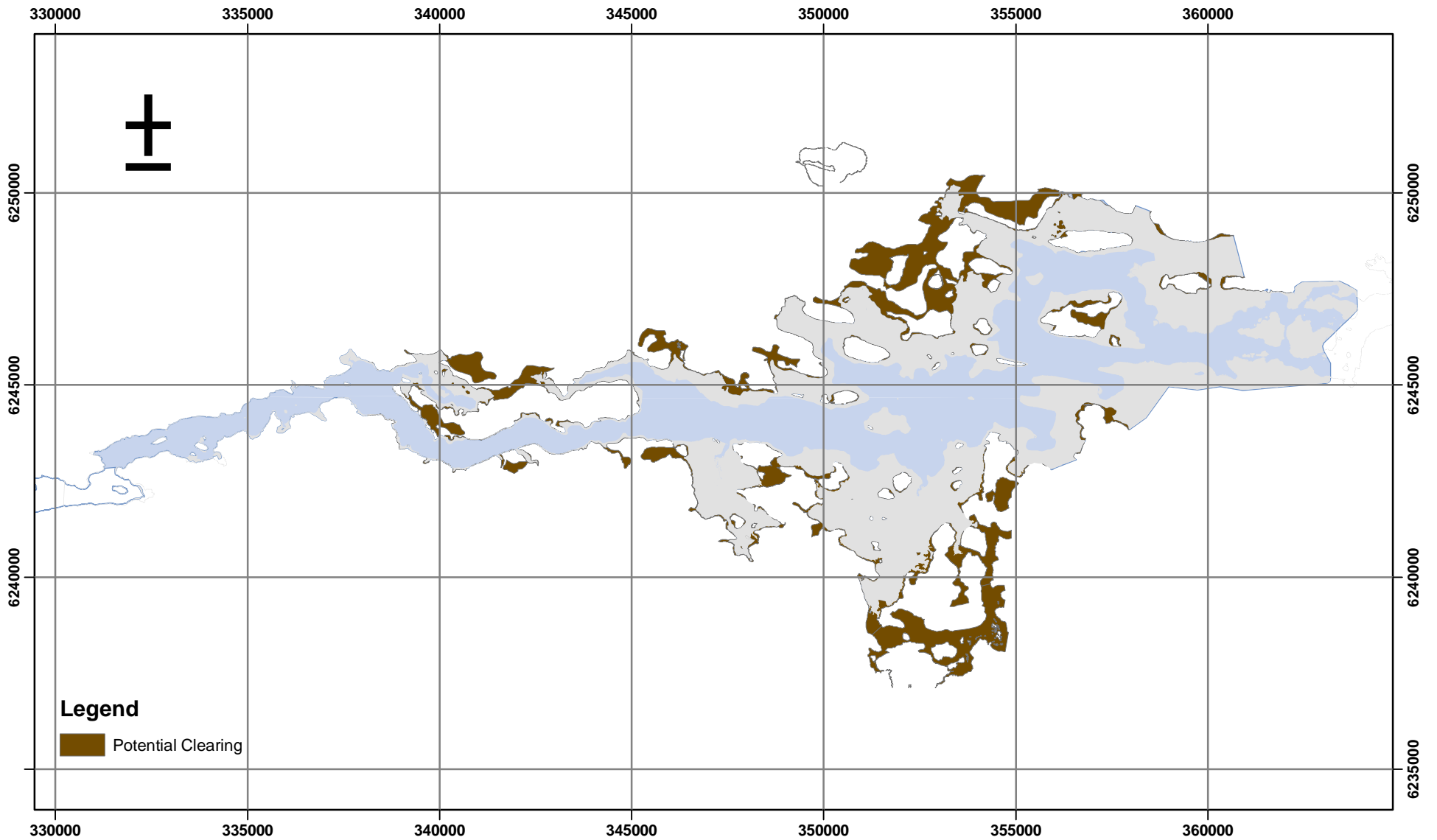
The objective of the debris prevention work set out in the **Waterways Management Program** is to prevent trees and other large woody debris from entering the water by removing them before they fall into the water dragging soil material with them.



RESERVOIR CLEARING PLAN
AREA TO BE CLEARED PRIOR TO FLOODING

Figure 1

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RESERVOIR CLEARING PLAN
POTENTIAL AREAS TO BE CLEARED AFTER FLOODING

Figure 2