JWEL PROJECT NO. 8223

DEMONSTRATION WINDPOWER PROJECT
ST. LAWRENCE BIRD SURVEYS

MAY 2002

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PREPARED FOR

NEWIND GROUP

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1 INTRODUCTION

The purpose of the NeWind Demonstration Wind Project is essentially to establish the reliability and durability of wind turbine generators in the harsh Newfoundland climate and their efficiency in providing electricity. The NeWind Group proposes to implement a 5 to 25 MW demonstration wind generation project consisting of up to 40 wind turbine generators with a rated capacity ranging between 600 kW and 1.8 MW. The wind turbines are horizontal axis, three bladed wind energy converters, with a maximum hub height of 70 metres. Their rotor diameter will be between 40 and 50 metres.

The site chosen for the wind farm is located in the lower elevations of Burin Peninsula, northwest of the town of St. Lawrence (Figure 1.1), to the north and south of Route 220. The gentle relief along with the unobstructed view of largely exposed areas will allow the wind to approach the wind turbines without reduction in intensity and interference by human or natural obstacles.

A more precise location for the wind turbine units within the St Lawrence area will be determined based on various information including, wind monitoring data obtained through the current wind monitoring stations, topography, soil conditions, etc., as well as information obtained from the bird surveys.

Collisions of birds with wind turbine generators have often been identified as an issue – often on the basis of presumed rather than documented interactions. The problem has primarily been identified in relation to mountain passes where large raptors ride the updrafts along the mountainside and inadvertently venture into the turbine rows. Also, the earlier turbine tower designs used latticed towers, which were attractive to raptors as perching locations. During take-off from the towers, raptors would be carried by the draft into the rotor of downwind-operated turbines.

Today's wind turbines are essentially upwind machines (i.e. the rotor is upwind from the tower) and are mounted on tubular towers which offer no opportunity for birds to perch. Furthermore, large turbines have reduced rotor tip speeds and rotating speeds (26 to 36 rpm), which reduces the likelihood of bird collisions. A recent review of bird impact studies in Europe and the United States indicate bird-turbine interactions resulting in mortality represent relatively minor occurrences (Kerlinger 2001a, 2001b).

The NeWind group will voluntarily implement a bird monitoring program at the St. Lawrence site in order to gather data on the presence if birds in the area and. This report outlines the proposed program.

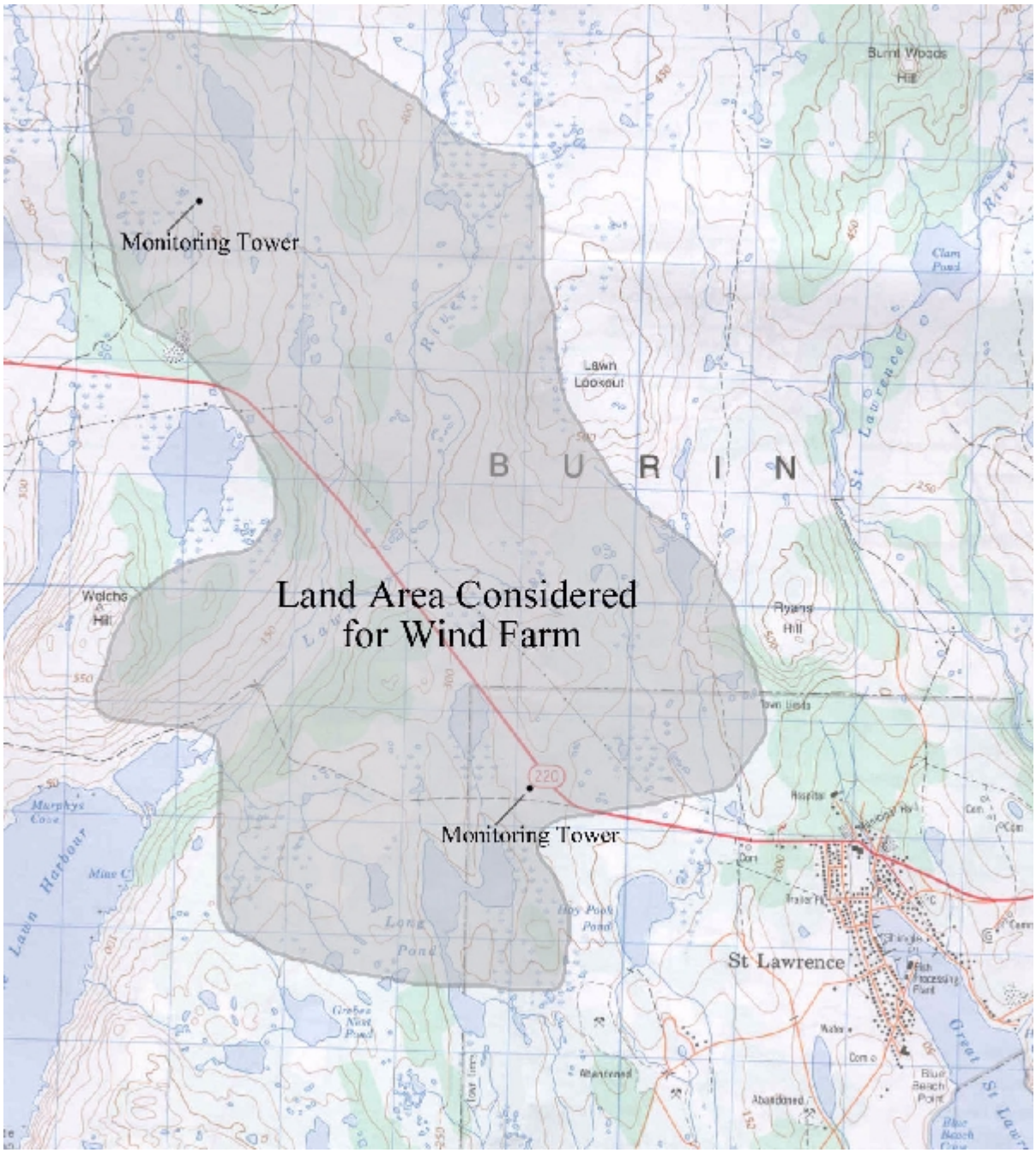

Figure 1.1 Proposed Location of the St. Lawrence Demonstration Wind Power Project

2 SPRING AND FALL MIGRATION SURVEYS

2.1 Objective

No formal seasonal bird surveys have been reported for the lower Burin Peninsula area. There is some existing information based on larger regional data and personal bird counts obtained in the St. Lawrence area, but these lack quantitative detail or specific focus on the area of interest. The objective of the spring and fall bird surveys is to provide qualitative and quantitative baseline data on migration routes and potential use of the proposed project area. These data will serve to better characterize the potential for interactions between the project and migrating birds. The specific goals are to gain:

- identification and numbers of birds that move through the area during spring and fall migration;
- gain information on the timing of the major migratory movements;
- gain information on route and flight path; and
- gain information on bird activities within the project area.

The results of the survey will be used to characterize the patterns evident in 2002 and to refine plans for additional seasonal or annual bird surveys. The current plan is to conduct spring and fall bird surveys in the current year, in the year of construction (2003), and during the first two years of operation (2004-2005). The program is adaptive so that the timing and methods may be modified to best address the program goals.

The data from the 2002 survey will be reviewed as part of the design process for the site layout. Future monitoring activities will also reflect a review of the information collected in 2002.

2.2 Timing

The spring migration survey began on april 23, 2002, the period when migrant birds are estimated to start arriving in the area (B. MacTavish pers. comm.). The surveys will continue for approximately three weeks. Any future studies conducted will begin in mid-March in order to capture the migration period of larger raptors such as bald eagle and osprey as well as the earlier migrations of other species.

Surveys for fall migration will commence around 10 September 2002 and will consist of 21 survey days covering the period 10 September to 15 October.

2.3 Survey Methods

Prior to construction, surveys will be conducted in, what is understood to be, the critical spring migration period. Bird observations during a fixed time period will be recorded at several (at least six) observation sites in the area, including (as indicated on Figure 2.1):

Locations in and around the proposed project area:

- monitoring tower site in northern portion of area,
- Lawn Lookout
- Welches Hill
- cart track between St. Lawrence and Lawn

Locations along the coast

- Middle Head
- Ferryland Head
- Shoal Cove Beach
- Hares Ears
- Little Lawn Harbour,

These locations have been selected based on assumed accessibility and unobstructed view. At the beginning of the survey, the effectiveness of the potential locations will be determined and alternatives may be reviewed. Locations may be added or dropped to provide better coverage or efficient travel between observation sites.

The estimated radius of effective coverage (in which it can be assumed all birds are recorded) will extend to 1 km from the observation point for observation sites 100 m above sea or ground level (Threlfall and Goudie 1986). The proposed sites provide observation opportunities along the coastline, south of the project area, and inland at locations on either side of the proposed wind farm. Final selection of observation sites will be based on accessibility and height above the surrounding landscape or sea. All observation sites will be located in reference to GPS coordinates to permit the elevations to be determined from topographic maps.

A survey event will consist of an observer, with spotting scope, identifying and counting birds for a 20-minute observation period. The number and species of birds or major group (*i.e.*, gull, raptor, shorebird) will be identified as well as the behaviour (loafing, flying, feeding, perching). When observations are made of flying birds, the general direction of flight will be recorded (as eighths of the compass rose). All bird species observed will be recorded. Other data to be recorded include date, location, weather conditions (particularly visibility) and survey period.

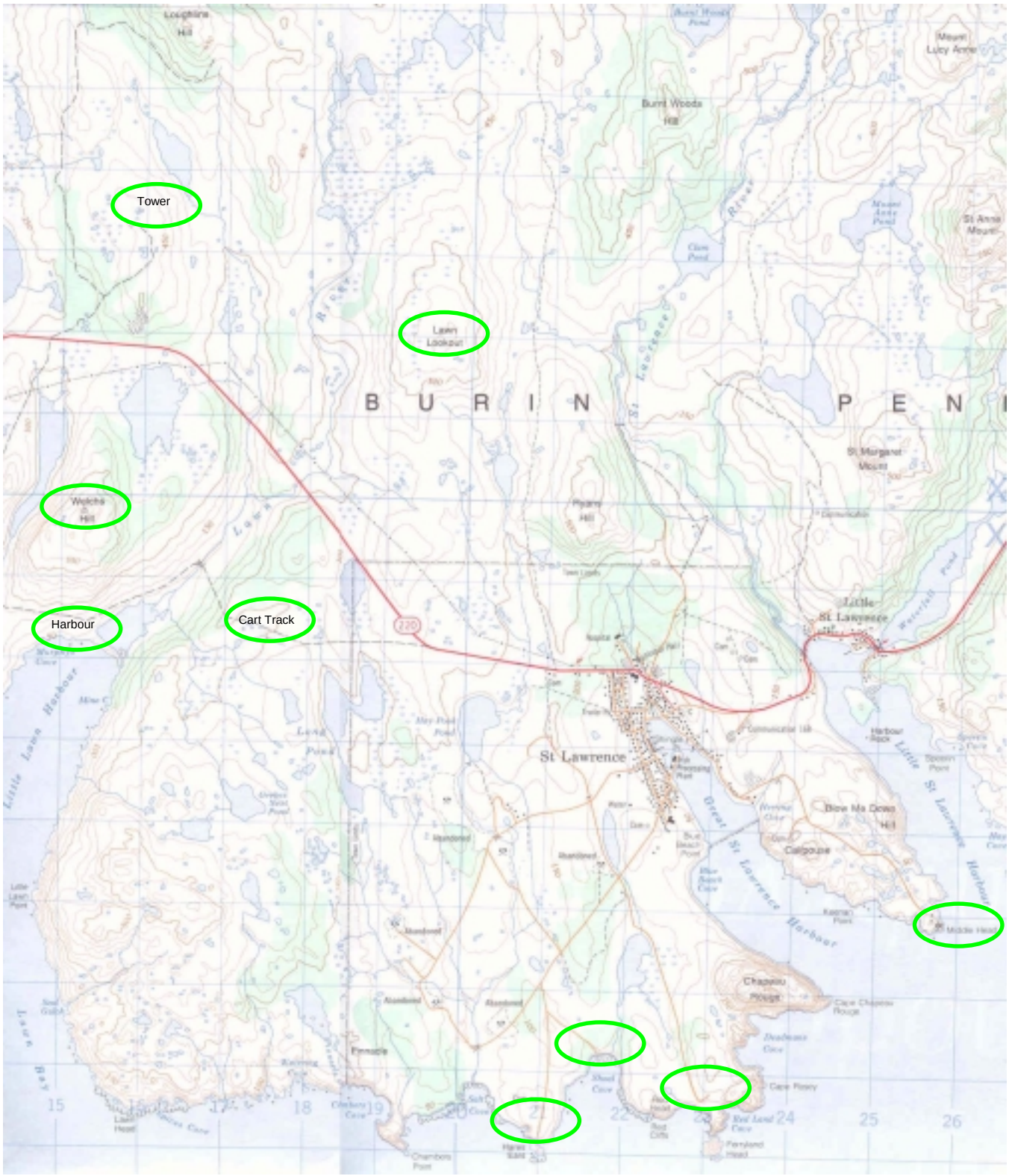

Figure 2.1 Potential Observation Sites for Migrating Bird Survey

As weather tends to influence pulses of migration (i.e., strong southerly winds in spring) and visibility, a daily weather log will be kept and surveys will only be conducted during suitable observation conditions. For example, surveys will not be conducted on days with heavy fog or rain.

Survey times will be staggered to ensure that observations occur at various times of the day at all sites, however, early morning and early evening are active periods for birds and surveys will be concentrated during these times.

A checklist maintained from 1992 to present by a local resident (N. Wilson *pers. comm.*) notes only one species of owl, the short-eared owl, which is active at dawn and dusk and is commonly seen during the day. No solely nocturnal species have been reported, thus no special survey efforts will be required for surveying owls.

2.4 Data to be Recorded

Observations will be made systematically from set vantage points. Additional opportunistic observations will be recorded on an ad hoc basis for inclusion in a separate data file. The standard data that will be recorded includes:

- date of the survey
- observer(s) who are collecting the data
- station # or ID will identify the location of the observer
- weather conditions will note wind, direction, precipitation and cloud cover
- horizontal visibility will be estimated in metres based on distances to visible landmarks
- ceiling will be estimated in metres or as low, medium, high, unlimited
- survey start and finish time will be recorded to establish time and duration of survey
- birds seen will be identified by species (if possible) or type
    - numbers will be noted or estimated where large flocks are observed
    - activity will be noted such as flying, perched, soaring, on ground, on water, etc.
    - flying birds will be assigned a direction of flight (heading)
    - height above ground will be estimated as low medium or high based on the height of a wind generating structure (i.e., hub height of 75-m). The monitoring towers are 50-m high. Birds flying lower than the tower would be “low”, those between 1-2 tower heights – “medium”, and over 100-m above ground would be “high”

The next page is a sample data sheet that will be used to record the observer data. This data sheet is developed in Microsoft EXCEL, thus allowing for future manipulation of data.

BIRD OBSERVATION DATA SHEET **PAGE ___ OF ___**

Date _____ **Observer** _____

Station Location_____ **Station Elevation (m)**_____

Temperature <0 0-9 10-19 20+

Cloud Cover clear overcast partial cloud (<50%)

Cloud ceiling low medium high

Precipitation rain snow other_____

Wind direction NW W SW S SE E NE N

Wind speed (Beaufort Scale) 3 4 5 6 7 8 9 10

Tide low medium high rising falling

Visibility low medium high

Body of water ocean protected bay cove lake pond river stream

Shoreline mainland barrier beach island sand bar

Inland field/meadow barrens bog marsh forest interior forest edge

Substrate sand beach dune gravel beach vegetated mud flat gravel

Species Observed _____

Activities: perching feeding floating preening

flying: NW W SW S SE E NE N

flight height: <10 m 11-50 m 51-100 m 101-300 m >300 m

3 RESIDENT BIRD SURVEY

3.1 Objective

A bird survey will also be conducted during the summer season to identify and enumerate songbirds and other species groups that frequent the area as summer residents. The data on numbers, species and activities that typically occur in the study area will be reviewed in the site planning process and will provide an indication of the potential for bird interactions, particularly raptors, willow ptarmigan, Canada geese and cormorants, with the structures.

3.2 Timing

This survey will be conducted during the period from mid-June to the first week of July and will cover approximately 10 days in the three-week period. Coverage will be generalized over the proposed site and later, when the configuration of the towers is determined, observations will be focussed on areas of proposed development. Monthly surveys during the winter months will be conducted to develop an index of resident bird use.

3.3 Survey Methods

Survey routes will be recorded using Global Positioning System (GPS). The walking rate will be approximately 0.5-2.0 km/hr, stopping (at most 30 s) when appropriate to record data, identify birds, or listen (Government of British Columbia 1999). All observations of birds will be recorded with particular concentration on identification of nest sites of raptors or other species within the turbine stations. For each bird encountered, species, estimated age, sex and activity will be recorded. Any nest encountered will be photographed and the location recorded using GPS.

Similar to the migration period, weather will influence the effectiveness of resident bird surveys. Therefore, a weather log will be kept and surveys will not be conducted during periods of rain or high winds.

The resident bird survey will be conducted in late June/early July 2002. It is anticipated that it will take approximately 10 days to survey the proposed turbine locations and access road alignments. Surveys will be conducted within the first three or four hours after sunrise.

Data will be recorded on sheets similar to that used for the migrating bird survey.

3.4 Ancillary Data

Newind has access to data collected in the area over the past 52 months (N Wilson *pers comm*). These data list over 120 species that have been observed as well as the time of year of the observations. The list includes 18 species that are potential residents in that they have been observed in at least ten of twelve months.

These data will be reviewed to provide an indication of the broad annual patterns of bird appearances and to characterize those species, which may be considered resident to the area.

4 OPERATIONAL MONITORING

4.1 Introduction

During operations, estimated to commence in late 2003, regular monitoring for bird fatalities will be conducted for the first two years of operation. Fatalities are determined from carcasses found near the structures.

Studies of observer efficiency and scavenging at sites in the United States indicate that small bird carcasses disappear more quickly than those of larger birds and are not as visible to searchers (Kerlinger 2001a). Large bird carcasses such as raptors are rarely missed and can remain visible on the ground for weeks or months. Northern harriers have been identified in the St. Lawrence area and are a potential species of interest, as they tend to soar low over open country when hunting. This behaviour is particularly risky when turbines are placed on steep hills (Kerlinger 2001b). Similarly, the habit of cormorants (great and double-crested) using sources of freshwater inland, may make them vulnerable to encountering the wind turbines. Cormorants have been observed flying inland in the St. Lawrence area. Both cormorants and northern harriers are fairly large birds and, carcasses are likely to remain visible for some time.

4.2 Objective

The objective of operational monitoring is to determine the magnitude (numbers) and timing of bird mortalities during the operation of the wind turbines. Data will be collected and expressed in terms of total numbers by species, seasonal timing, and diurnal timing (if possible).

4.3 Timing

The method for operational monitoring of bird mortalities will consist initially of daily checks at the base of all operating turbines for the first month. Based on a review of the data, the frequency of surveys will be reduced to biweekly checks at half the turbines, with all turbines searched at least once in any 28-day period (Strickland *et al.* 2001). Once tower locations are finalized, monitoring will be conducted prior to construction, during construction and during the first two years of operation.

4.4 Methods

The search area is within a 50-m square plot around each wind turbine structure. Transects are set 6 m apart with the searcher walking at a rate of 45-60 m/min searching both sides out to 3 m (Johnson *et al.* 1993 cited in Strickland *et al.* 2001). Once tower locations are finalized, and prior to and during construction, monitoring will be conducted to develop an index of bird mortality from non-project-related sources.

Notes on location, species, carcass condition, time since last survey (*i.e.*, possible time on the ground) or evidence of scavenging will be made on any bird carcasses found. When species cannot be identified due to decay or scavenging, information such as relative size or species group (gull, duck, and songbird) will be recorded if possible. All carcasses will be collected, labelled and frozen for distribution to the District Forest Resources Office in Clarenville for subsequent delivery to Dr. Hugh Whitney at the Provincial Veterinary Laboratory, Brookfield Road, St. John's.

5 EVALUATION AND REVISION

Canadian Wildlife Service and the provincial Wildlife Division will be provided with the opportunity to review and provide comment on any proposed revisions or additions to the program.

6 REPORTING

A report of the monitoring program, together with any recommended changes to the program, will be completed annually and provided to the Minister of Environment for information purposes. Following completion of the monitoring program, a final report, including an effects analysis, will be produced and provided to the Minister of Environment.

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