

**Audit of Timber Harvesting and Road  
Construction, Maintenance and Deactivation**

**Forest Licence A16828  
Northwood Pulp and Timber Ltd.  
Houston Division**

**FPB/ARC/18  
June 1999**

January 7, 2000

**Re: Forest Practices Board Audit Report for Forest Licence A16828, Northwood Pulp and Timber Ltd., Houston Division**

The release of this audit report was delayed from June 1999 until January 2000 as a result of court proceedings. In June, Northwood obtained a court order preventing the Board from releasing the report until a judicial review of the Board's authority was decided. A hearing on the Board's jurisdiction to make some of the comments in this report was held in October 1999 in BC Supreme Court. On November 30, 1999, Justice Donald Brenner ruled that the Board is entitled to make the comments about excessive soil disturbance that appear in this report. Northwood appealed that decision and requested that the order prohibiting release of the report be extended until the appeal is heard. On January 7, 2000, the Court of Appeal rejected the request to extend the order and the Board is now releasing the report, as permitted by the Court.

The Board has asked that Northwood and the Ministry of Forests respond to the recommendations made in this report. As a result of the delays explained above, the deadlines for response have now passed. The following replaces the wording in the Board's request for responses under section 186 of the *Forest Practices Code of British Columbia Act*, which appear on page A-3 and A-4 of this report:

The Board requests that Northwood advise the Ministry of Forests, Houston Forest District, with a copy to the Board, by **March 31, 2000**, of the actions taken and the timing to address recommendations 1, 2 and 3.

The Board requests that the Ministry of Forests, Houston Forest District, confirm by **June 30, 2000** that:

- recommendations 1 and 3 are being addressed in Northwood's silviculture prescriptions and forest development plans; and
- that road deactivation has been completed according to the forest development plans.

The Board requests that the government advise the Board by **March 31, 2000**, of the actions taken to address recommendation 5.

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## A. Report from the Board

This is the Board's report on a compliance audit<sup>1</sup> of Forest Licence A16828<sup>2</sup> held by Northwood Pulp and Timber Ltd., Houston Division (Northwood). The operating areas of Forest Licence A16828 are located near Houston, BC shown on the attached map. Operations are spread throughout this area with concentrations north of Houston near Babine Lake and south of Houston near Ootsa Lake.

The audit examined Northwood's timber harvesting and road practices, and the related operational plans, for the period July 1, 1996 to July 1, 1997, to assess compliance with the *Forest Practices Code of British Columbia Act* and related regulations (the Code).

Prior to completing this report, the Board considered written submissions from Northwood as required by section 182 of the Act.

### Conclusions

The Board's conclusions are based on an audit of the following practices:

- operational plans, including Northwood's two forest development plans, as they relate to harvesting and road practices
- harvesting of 102 cutblocks
- harvesting of 449 cutblocks that were less than one hectare in size for salvage and control of mountain pine beetle
- construction of 41 road sections
- maintenance of approximately 1 000 kilometers of road
- deactivation of 50 road sections

Northwood's timber harvesting and road construction practices complied with the Code in all significant respects.

The auditors commented on concentrated rutting and excessive compaction of soils that had occurred on ten cutblocks during timber harvesting. Since the levels of soil disturbance were within limits specified in approved silviculture prescriptions, this did not constitute non-compliance with the Code. The soil compaction and rutting were caused by logging equipment operating during wet conditions. Although the levels of site disturbance were within approved limits, the Board is concerned about the frequency and extent of compaction and rutting. This affects soil productivity and will have long-term impacts on tree establishment and growth. This

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1 Part B of this document provides background information on the Board's audit program and the process followed by the Board in preparing its report.

2 The report from the auditor (Part C of this document) provides specifics about the operating areas of Forest Licence A16828, and the forest planning and field activities of Northwood Pulp and Timber that were the subject of this audit and the audit findings.

is not consistent with sound forest practices. Northwood could have prevented this situation by using different equipment or operating during drier conditions.

The auditors identified instances of non-compliance on many of the road sections examined for Northwood's road maintenance practices. While each instance was not significant, the frequency of these instances of non-compliance was considered significant. These included crushed or blocked culverts, disrupted natural drainage patterns, hazard trees that were not removed, missing bridge delineators, and insufficient brushing. The impact of deficient road maintenance was low to moderate because the terrain was gentle and there were few road users or other forest resources, such as streams, directly affected. However, if such practices continue, there is potential for greater environmental effects on steeper terrain or where significant forest resource values are present. There is also the potential for creating substantial safety hazards that could affect anyone using the roads.

Northwood has advised the Board that it has implemented a system that it expects will allow it to better manage its road maintenance obligations. This includes developing standard operating procedures for road and bridge inspections and linking the inspections to records about roads.

Northwood did not comply with the Code when planning and carrying out road deactivation. The Code requires that a forest development plan describe both the deactivation work completed in the past year and the work planned in the future. This allows regulatory agencies, third parties and the public to know what work has been recently done and to participate effectively in the planning process for upcoming work.

While no problems were identified with the actual deactivation work, Northwood's road deactivation work was not carried out according to the 1996-2001 Forest Development Plan (FDP), which came into effect during the audit period. The following situations were identified during the audit:

- roads which require deactivation but were not identified in the FDP deactivation or maintenance tables
- roads which had been deactivated recently but were not identified in the FDP
- roads where observed deactivation was to a level different than identified in the FDP
- roads which were recorded as having been deactivated, but where no deactivation was observed by the auditors

Lack of clarity between plans and activities makes it difficult for regulatory agencies, third parties and the public to participate effectively in the planning process. This could result in safety concerns, loss of access and confusion about what access is available to other road-users.

Northwood has advised the Board that it can now track and schedule deactivation activities on all segments of its roads and can accurately display those activities in forest development plans. Northwood has also advised that it has amended its standard operating procedure to ensure that deactivation activities are consistent with higher level plans and approved forest development plans.

## **Recommendations**

In accordance with section 185 of the *Forest Practices Code of British Columbia Act*, the Board makes the recommendations set out below. In accordance with section 186 of the Act, the Board requests that parties notify it of steps taken in response to the recommendations, as set out below.

### **Recommendation 1–Rutting and Soil Compaction**

Because the risk of loss of soil productivity on sensitive and wet soils is high, the Board recommends that Northwood Pulp and Timber prevent loss of soil productivity by avoiding concentrated rutting and soil compaction during harvesting operations. Northwood should include measures such as:

- adequately identifying sensitive or wet soils;
- specifying, in silviculture prescriptions, seasonal and site constraints;
- specifying, in silviculture prescriptions, soil disturbance levels that reflect actual site conditions and prevent loss of soil productivity; and,
- avoiding the use of heavy equipment during wet seasons or on wet soils.

### **Recommendation 2–Road Maintenance**

The Board recommends that Northwood Pulp and Timber ensure that its road maintenance complies with Code requirements. This should include reviewing and continuing to develop and implement operating procedures for inspecting roads and carrying out road maintenance.

### **Recommendation 3–Road Deactivation**

The Board recommends that Northwood Pulp and Timber:

- a) ensure that all planned and completed road deactivation is identified in forest development plans, and
- b) complete the deactivation activities identified in the 1996 - 2001 Forest Development Plan.

The Board requests that Northwood advise the Ministry of Forests, Houston Forest District, with a copy to the Board, by September 30, 1999, of the actions taken and the timing to address the above three recommendations.

The Board requests that the Ministry of Forests, Houston Forest District, confirm by December 31, 1999, that:

- recommendations 1 and 3 are being addressed in Northwood's silviculture prescriptions and forest development plans; and
- that road deactivation has been completed according to the forest development plans.

#### **Recommendation 4—Soil Conservation**


In the interest of sound forest practices, the Board recommends that those who prepare silviculture prescriptions for Northwood, and approve them on behalf of the Ministry of Forests, must ensure that the prescriptions contain adequate measures to prevent loss of soil productivity from rutting and soil compaction during timber harvesting.

#### **Recommendation 5—Amendment to *Silviculture Practices Regulation***

Section 45(3) of the *Forest Practices Code of British Columbia Act* prohibits a person from carrying out a forest practice that results in inordinate soil disturbance, due to weather conditions or site factors. The term “inordinate soil disturbance” is defined in section 30(1) of the *Silviculture Practices Regulation*.

The Board recommends that the government amend section 30(1) of the *Silviculture Practices Regulation* so that the definition of “inordinate soil disturbance” includes situations of concentrated rutting and excessive soil compaction that affect soil productivity.

The Board requests that government advise the Board, by September 30, 1999, of the actions taken to address the above recommendation.



Keith Moore  
Chair

June 14, 1999

## **B. Forest Practices Board Compliance Audit Process**

### **Background**

The Forest Practices Board conducts audits of government's and agreement holder's compliance with the *Forest Practices Code of British Columbia Act* and regulations (the Code). The Board is given the authority to conduct these periodic independent audits by section 176 of the Act.

Compliance audits examine forest planning and practices to determine whether or not they meet Code requirements.

The Board undertakes both "limited scope" and "full scope" compliance audits. A limited scope audit involves the examination of selected forest practices (e.g., roads, or timber harvesting, or silviculture) and the related operational planning activities. A full scope audit examines all operational planning activities and forest practices.

The Board determines how many audits it will conduct in a year, and what type of audits (limited or full scope), based on budget and other considerations. The Board audits agreement holders who have forest licences or other tenures under the *Forest Act* or the *Range Act*. The Board also audits government's Small Business Forest Enterprise Program (SBFEP) which is administered by Ministry of Forests district offices. Selection of agreement holders and district SBFEPs for audit is done randomly, using a computer program, to ensure a fair, unbiased selection of auditees.

### **Audit Standards**

Audits by the Forest Practices Board are conducted in accordance with the auditing standards developed by the Board. These standards are consistent with generally accepted auditing standards.

The audits determine compliance with the Code based on criteria derived from the *Forest Practices Code of British Columbia Act* and its related regulations. Audit criteria are established for the evaluation or measurement of each practice required by the Code. The criteria reflect judgments about the level of performance that constitutes compliance with each requirement.

The standards and procedures for compliance audits are described in the Board's *Reference Manual—Compliance Audits*.

### **Audit Process**

#### **Conducting the Audit**

Once the Board selects an audit and decides on the scope of the audit (limited scope or full scope), the staff and resources required to conduct the audit and the period covered by the audit are determined. Board staff also meet with the party being audited to discuss the logistics of the audit before commencing the work.



All the activities carried out during the period subject to audit are identified. This includes activities such as the sites harvested or replanted and road sections built or deactivated during the audit period. The items that comprise each forest activity are referred to as a “population.” For example, all sites harvested form the “timber harvesting population.” All road sections constructed form the “road construction population.” The populations are then sub-divided based on factors such as the characteristics of the sites and the potential severity of the consequences of non-compliance on the sites.

The most efficient means of obtaining information to conclude whether there is compliance with the Code is chosen for each population. Because of limited resources, sampling is usually relied upon to obtain audit evidence, rather than inspecting all activities.

Individual sites and forest practices within each population have different characteristics, such as the type of terrain or type of yarding. Each population is divided into distinct sub-populations on the basis of common characteristics (e.g., steep ground vs. flat ground). A separate sample is selected for each population (e.g., the cutblocks selected for auditing timber harvesting). Within each population, more audit effort (i.e., more audit sampling) is allocated to the sub-population where the risk of non-compliance is greater.

Audit work in the field includes assessments from helicopters and intensive ground procedures such as the measurement of specific features like road width. The audit teams generally spend two to three weeks in the field.

## **Evaluating the Results**

The Board recognizes that compliance with the many requirements of the Code is more a matter of degree than absolute adherence. Determining compliance requires the exercise of professional judgment within the direction provided by the Board.

Auditors collect, analyze, interpret and document information to support the audit results. The audit team, comprised of professionals and technical experts, first determines whether forest practices are in compliance with Code requirements. For those practices considered to not be in compliance, the audit team then evaluates the degree to which the practices are judged not in compliance. The significance of the non-compliance is determined based on a number of criteria including the magnitude of the event, the frequency of its occurrence, and the severity of the consequences.

As part of the assessment process, auditors categorize their findings into the following levels of compliance:

**Compliance** – where the auditor finds that practices meet Code requirements.

**Not significant non-compliance** – where the auditor, upon reaching a non-compliance conclusion, determines that a non-compliance event, or the accumulation and consequences of a number of non-compliance events, is not significant and is not considered worthy of reporting.

**Significant non-compliance** – where the auditor determines that the event or condition, or the accumulation and consequences of a number of non-compliance events or conditions, is significant and is considered worthy of reporting.

**Significant breach** – where the auditor finds that significant harm has occurred or is beginning to occur to persons or the environment as a result of the non-compliance. A significant breach can also result from the cumulative effect of a number of non-compliance events or conditions.

Identification of a possible significant breach requires the auditor to conduct tests to confirm whether or not there has been a breach. If it is determined that a significant breach has occurred, the auditor is required by the *Forest Practices Board Regulation* to immediately advise the Board, the party being audited, and the Ministers of Forests, Energy & Mines, and Environment, Lands & Parks.

## **Reporting**

Based on the above evaluation, the auditor then prepares the “Report from the Auditor” for submission to the Board. The party being audited is given a draft of the report before it is submitted to the Board so that the party is fully aware of the findings. The party is also kept fully informed of the audit findings throughout the process, and is given opportunities to provide additional relevant information and to ensure the auditor has complete and correct information.

Once the auditor submits the report, the Board reviews it and determines whether any party or person is potentially adversely affected by the audit findings. If so, the party or person must be given an opportunity to make representations before the Board decides the matter and issues a final report to the public and government. The representations allow potentially adversely affected parties to present their views to the Board.

At the discretion of the Board, representations may be written or oral. The Board will generally offer written representations to potentially adversely affected parties, unless the circumstances strongly support the need for an oral hearing.

The Board then reviews both the report from the auditor and the representations before preparing its final report, which includes the Board’s conclusions and may also include recommendations, if appropriate.

If the Board’s conclusions or recommendations result in newly adversely affected parties or persons, additional representations would be required.

Once the representations have been completed, the report is finalized and released: first to the auditee and then to the public and government.

## C. Report from the Auditor

### 1.0 Introduction

As a part of the Forest Practices Board's 1997 compliance audit program, Forest Licence A16828 was selected for audit from the population of major forest licences within the Prince Rupert Forest Region. The licence, held by Northwood Pulp and Timber Ltd., was selected randomly and not on the basis of location or level of performance.

Forest Licence A16828 is managed by the Houston Division of Northwood Pulp and Timber Ltd. and is within the Morice Timber Supply Area. The area of operations covers approximately 600,000 hectares in the Morice Forest District, from the northeast side of the Babine Lake to the Tahtsa Reach on Ootsa Lake, as shown on the attached map. Operations are divided into two major operating areas north and south of Houston, BC.

The licence has an allowable annual cut of 1,064,484 cubic meters, harvested predominantly through conventional clear-cutting.

### 2.0 Audit Scope

The audit examined the forest planning and field activities related to timber harvesting and road construction, maintenance and deactivation. These activities were assessed for compliance with the *Forest Practices Code of British Columbia Act* and related regulations (the Code), including the transitional provisions of the Code.

All timber harvesting, road construction and deactivation, and road maintenance obligations for the period July 1, 1996, to July 1, 1997, were included in the scope of the audit. This involved examining all aspects of operational planning - such as forest development plans<sup>i</sup>, silviculture prescriptions<sup>ii</sup>, and logging plans<sup>iii</sup> - that supported the activities examined during the audit period.

The field activities carried out during the audit period, and therefore subject to audit, are described below:

- the harvesting of 102 cutblocks;
- the harvesting of 449 cutblocks less than one hectare in size to control or salvage trees affected by mountain pine beetle;
- the construction of 170 kilometres of road on 41 road sections;
- the deactivation of approximately 50 roads, the majority of which were within cutblocks with each road less than one kilometre in length; and,
- the maintenance of approximately 1,000 kilometres of road, involving activities such as surfacing and the cleaning of culverts and ditches.

Operational plans that were approved during the audit period include 56 silviculture prescriptions and 52 logging plans. The audit work on operational plans approved in the audit

period and not implemented was limited to reviewing the content requirements only, with no field testing of these plans.

Section 3 describes the results of the audit. The Board's audit reference manual, "*Reference Manual - Compliance Audits, Version 2, May 1997*", sets out the standards and procedures that were used for this audit.

### **3.0 Audit Findings**

#### **Planning and practices examined**

The audit work on selected roads and cutblocks included assessments from the air using helicopters and ground-based procedures. The audit examined:

- operational planning on 15 cutblocks where timber harvesting had not commenced;
- timber harvesting practices on 41 cutblocks and the related operational plans;
- harvesting practices on 30 cutblocks for salvage or control of timber affected by mountain pine beetle;
- the construction of 13 road sections totaling 36.4 kilometres;
- the maintenance of 17 road sections totaling 167 kilometres; and
- the deactivation of 24 road sections of road including 14 assessed from the air.

#### **Findings**

Timber harvesting – The timber harvesting activities were in compliance, in all significant respects, with Code requirements. In reaching the conclusion that timber harvesting complied in all significant respects, the audit identified concerns with excessive rutting and compaction of soils, which are described in section 4 of this report. These did not constitute non-compliance because the measured site disturbance was within the limits allowed by the Code for each cutblock.

Road construction – The road construction activities were in compliance, in all significant respects, with Code requirements.

Road maintenance – The road maintenance activities were not adequately carried out because of non-compliance with Code requirements on many of the road sections examined. Examples of non-compliance identified by the audit included the alteration of natural drainage patterns, damaged culverts, and safety hazards which include the failure of road prisms (road surface, cutslope and fillslope).

Road deactivation – The road deactivation activities did not comply with Code requirements for the following reasons:

- road deactivation work shown in the forest development plan was not performed;

- road deactivation work referenced by Northwood as completed in correspondence to a regulatory agency was not performed; and
- roads deactivated were not included in the forest development plan.

The audit determined that these practices do not represent a significant breach because significant harm to persons or the environment had neither occurred nor was beginning to occur.

### **3.1 Road Maintenance**

Of the 17 road sections examined for maintenance activities, the audit identified that most had one or more instances of deficient road maintenance. Examples of these non-compliance deficiencies and their impacts are detailed below:

- Culverts that were crushed, blocked or otherwise not functioning resulted in ponding of water, and the disruption of natural drainage patterns. Altered drainage patterns caused or contributed to road surface erosion, rutting, and the deposition of sediment into fish bearing streams.
- A safety hazard existed to road users from the failure of road prisms due to inadequate drainage structures on roads built in the winter, hazard trees not removed from right-of-ways, and poor visibility due to insufficient brushing.

The impacts to forest resources and road users resulting from deficient maintenance on each road location was not significant. However, the audit concluded that the frequency of the maintenance deficiencies represents significant non-compliance with Code requirements.

The main areas of the Code to which the above non-compliance relates are Section 63(1) of the Code, which requires that a person maintain roads used under the authority of road permits, and Section 17(1) of the *Forest Road Regulation*, which specifies the maintenance requirements for persons required to maintain roads.

### **3.2 Road Deactivation**

The audit examined 24 roads for deactivation activities. These included roads identified for deactivation in the forest development plan and roads that were not included in the forest development plan.

On roads identified for deactivation in the forest development plan the audit found that either no deactivation work had occurred or the planned level of deactivation was not carried out.

A number of roads that were not identified for deactivation in the forest development plan were referenced by Northwood in their correspondence to a regulatory agency as having been deactivated. The audit found that no deactivation work had taken place on these roads.

In addition, a number of roads deactivated by Northwood were not identified for deactivation in the forest development plan.

At the time of the audit, the impact to road users and forest resources from road deactivation not being carried out in accordance with the forest development plan was not significant. No problems were identified with the actual deactivation work carried out on the ground.

Section 15 of the *Operational Planning Regulation* specifies that a forest development plan must identify road deactivation operations, including the level of deactivation, that are to be conducted in each of the first three years of the forest development plan.

The audit concluded that the deactivation activities carried out are not in compliance with those set out and approved in the forest development plan. Consequently, regulatory agencies, third parties and the public are deprived of the opportunity to provide effective input to the forest development plan as a result of deficient information on planned road deactivation activities. Inadequate information about road deactivation could result in inappropriate limitation of access to forest road users and potential safety concerns.

#### **4.0 Other – Comment on rutting and soil compaction**

The audit identified levels of rutting and soil compaction that were considered excessive but complied with Code requirements.

The rutting and compaction of soils resulted from heavy machinery being operated on moist to saturated fine-textured soils. In some cutblocks this involved areas up to one or more hectares in size being impacted by the concentrated rutting and compaction of soils. Code standards do not preclude these type of adverse impacts from occurring.

The concentrated areas of rutting and compaction, which were observed on 10 cutblocks harvested mostly in the summer, have likely affected the productivity and the ability of these sites to produce crop trees in the future. Issues such as reduced root capacity, increased timber blow-down potential and generally poor tree growth can result from the rutting and compaction that occurred in these areas

The concentrated rutting and excessive soil compaction was not considered to be non-compliance with the Code because survey measurements indicated the disturbance levels were less than the maximum allowable levels specified by the silviculture prescriptions for each of the cutblocks. Results still remained below maximum allowable levels even when the survey measurements were localized on one hectare portions of the cutblocks that contained the highest levels of soil disturbance.

#### **5.0 Audit Opinion**

##### **Timber harvesting and road construction and maintenance**

In my opinion, except for the significant non-compliance described below, the timber harvesting and road construction and maintenance activities carried out by Northwood Pulp and Timber Limited - Houston Division on Forest Licence A16828 from July 1, 1996 to July 1, 1997, were in compliance, in all significant respects, with the road and harvesting requirements of the Code as of July 1997.

As described in section 3, non-compliance with Code requirements for road maintenance was identified on many of the road sections examined. Examples of non-compliance identified by the audit included the alteration of natural drainage patterns, damaged culverts, and safety hazards which include the failure of road prisms (road surface, cutslope and fillslope). Although the impacts to forest resources and road users from the non-compliance were not significant, the frequency of the maintenance deficiencies was considered significant.

### **Road deactivation**

In my opinion, the road deactivation carried out by Northwood Pulp and Timber Limited - Houston Division on Forest Licence A16828 from July 1, 1996, to July 1, 1997, did not comply with Code requirements because most road deactivation work was not carried out in accordance with the forest development plan. As described in section 3.2, this included roads that were deactivated but not planned for deactivation in the forest development plan, roads planned for deactivation were either not deactivated at all or were deactivated to a level different than planned, and no deactivation work occurred on roads that were indicated to a regulatory agency as being deactivated.

No problems were identified with the actual deactivation work carried out on the ground. However, inadequate information about road deactivation could result in inappropriate limitation of access to forest resource users and safety concerns.

### **Other**

Without further qualifying my opinion, I also draw attention to the concern described in section 4 that Code standards do not preclude localized rutting and excessive soil compaction. The localized rutting and excessive soil compaction, within areas that were one hectare or more in size, have likely affected the productivity and the ability of these sites to produce crop trees in the future.

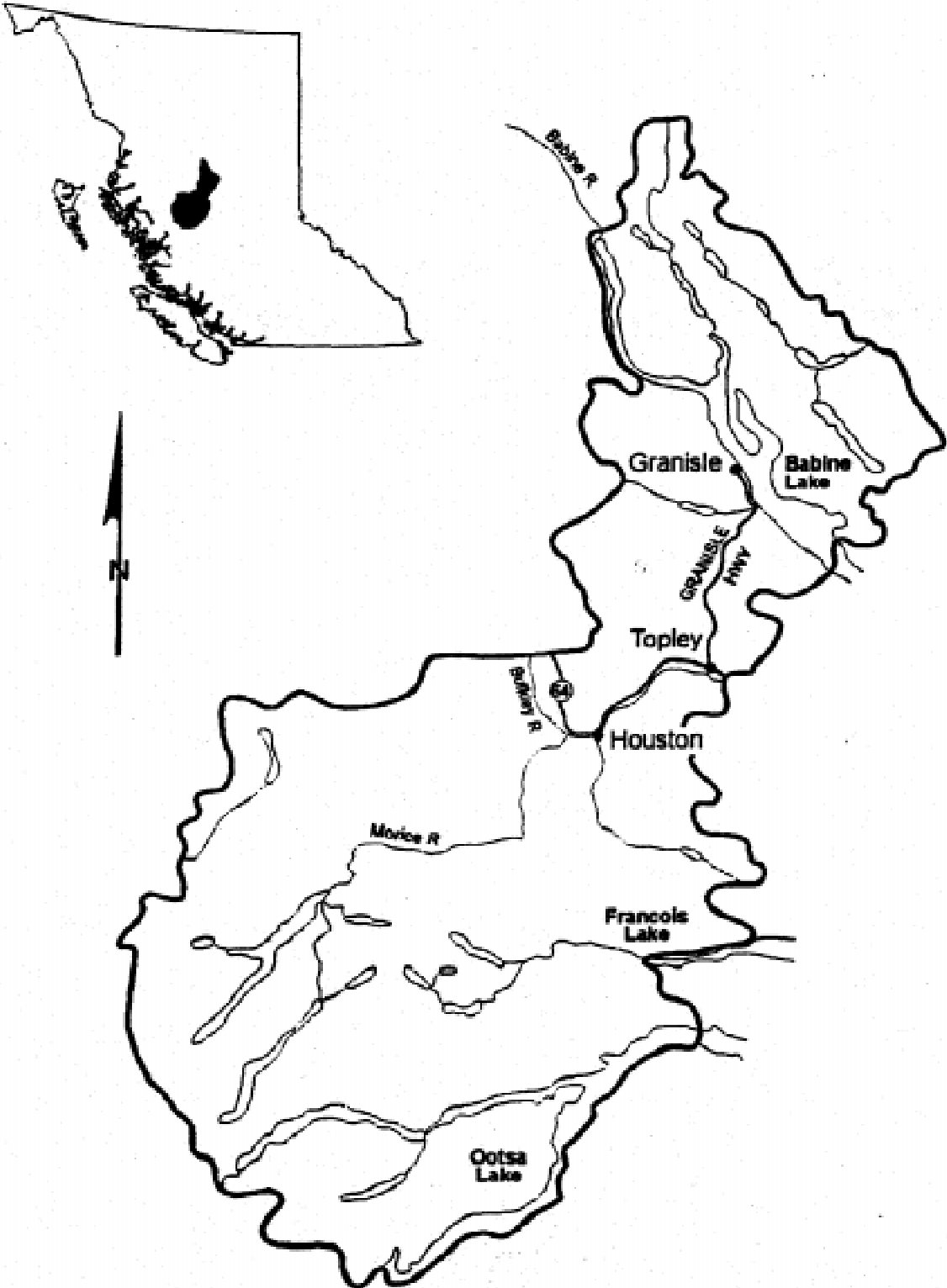
In reference to compliance, the term “in all significant respects” recognizes that there may be minor instances of non-compliance that either may not be detected by the audit, or that were detected but not considered worthy of inclusion in the audit report.

Sections 2 and 3 of this report from the auditor describe the basis of the audit work that formed the basis for reaching the above opinions. The audit was conducted in accordance with the auditing standards of the Forest Practices Board. Such an audit includes examining sufficient road and timber harvesting practices to support an overall evaluation of compliance with the Code.



Sucha More, CA  
Auditor  
Forest Practices Board

**Operating Areas of Forest Licence A16828  
Northwood Pulp and Timber Ltd.**





## Endnotes

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i A forest development plan is an operational plan which provides the public and government agencies with information about the location and scheduling of proposed roads and cutblocks for harvesting timber over a period of at least five years. The plan must specify measures that will be carried out to protect forest resources (including water, fisheries and other forest resources). It must also illustrate and describe how objectives and strategies established in higher level plans, where they have been prepared, will be carried out. Site specific plans are required to be consistent with the forest development plan.

ii A silviculture prescription is a site specific operational plan that describes the forest management objectives for an area to be harvested (a cutblock). The silviculture prescriptions examined in the audit are required to describe the management activities proposed to maintain the inherent productivity of the site, accommodate all resource values including biological diversity, and produce a free growing stand capable of meeting stated management objectives. Silviculture prescriptions must be consistent with higher level plans that encompass the area to which the prescription applies.

iii A logging plan is an operational plan that details how, when, and where timber harvesting and road construction activities will take place in a cutblock in accordance with the approved silviculture prescription and forest development plan for the area. Information about other forest resource values, plus all current field information for the area, must be clearly shown in the logging plan.