Block 291312 Inspection

Englishman River

- Island Timberlands -

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Island Timberlands

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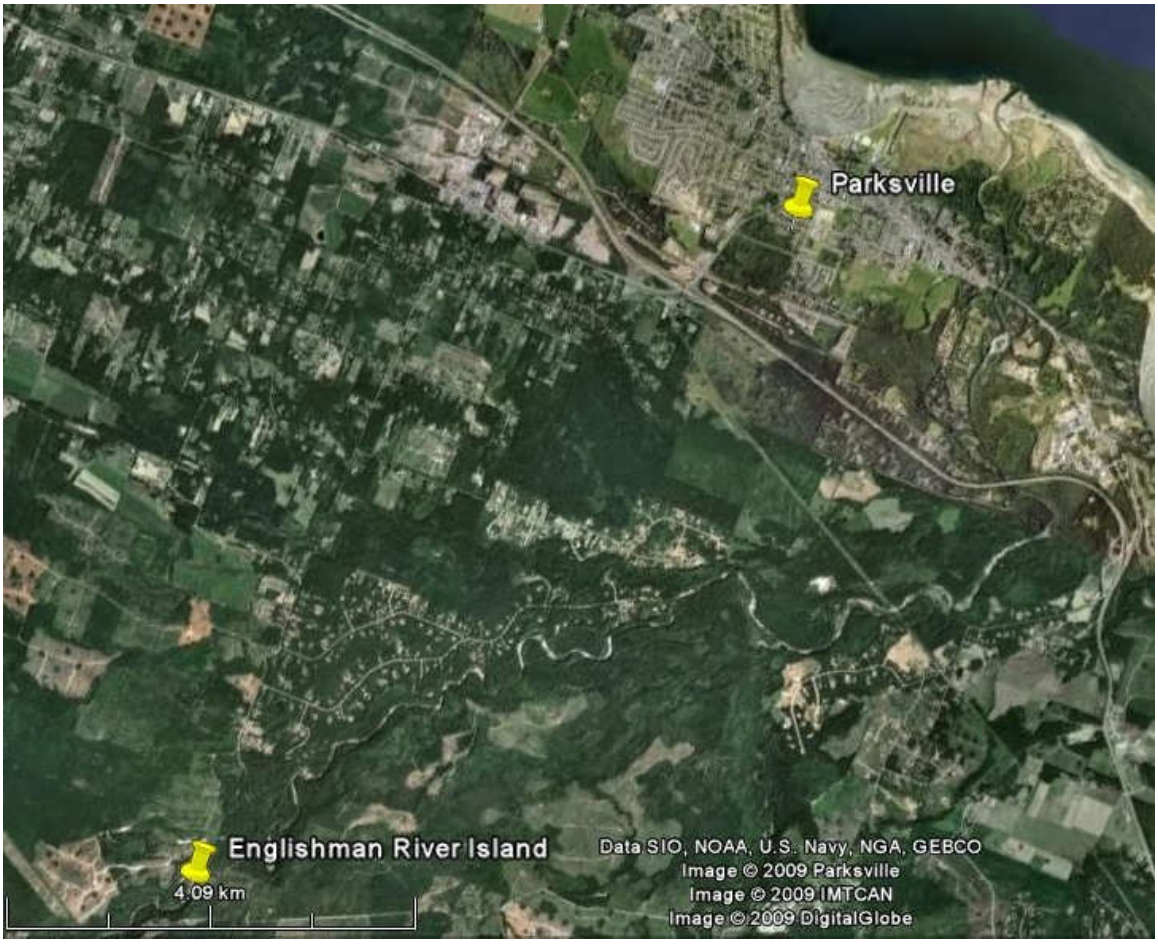
1. Introduction

This report summarizes the results of an inspection of a portion of Block 291312 located on the Englishman River within Island Timberlands (IT) Managed Forest 19 (Figure 1). At the request of the Executive Director of the Private Managed Forest Land Council (Council), I visited the Block on February 17, 2009 with Makenzie Leine, Brad Rodway, Jim Sears, Kraig Urbanoski, and Bill Waugh, all IT staff. Laura Coward, Ministry of Agriculture and Lands, as well as Brad Rushton, Fisheries and Oceans Canada, were also present. The purpose of this site visit was to:

- Carry out a joint block inspection with IT representatives in order to assess whether there had been, or is likely to be, any material harm to fish habitat or drinking water quality in the Englishman River downstream of the Block;
- Collect sufficient technical information to enable the Executive Director of the Council to determine whether there may be any potential contraventions of the Council Regulation; and
- Comment on the risk of future impacts to fish and/or fish habitat.

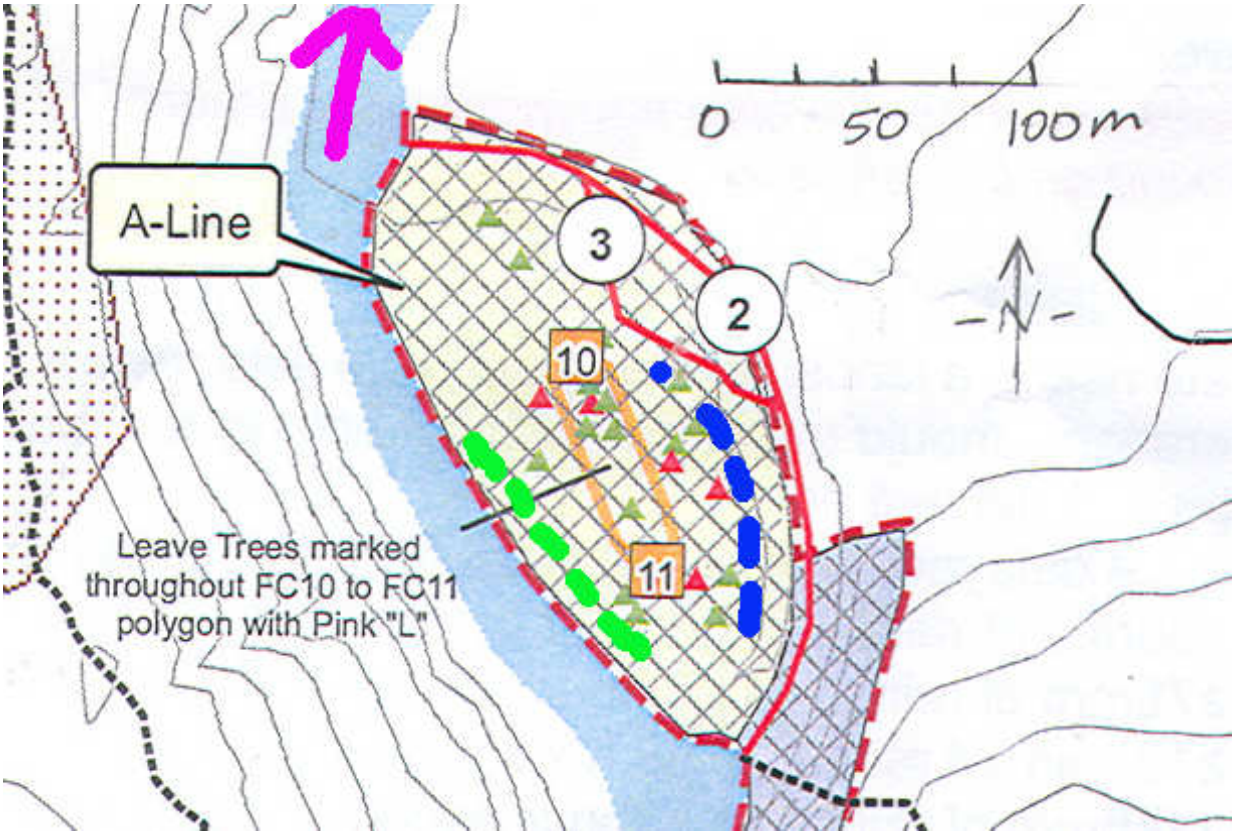
Figure 1 An aerial view from Google Earth showing the location of Block 291312 on the Englishman River in relation to the City of Parksville.



2. General Site Description

Block 291312 is located at UTM coordinates 10U Easting 401122 Northing 5454884, which is approximately 8 km south-southwest of the City of Parksville (Figure 1). The portion of Block 291312 that was inspected is a small island on the Englishman River (Figure 2; Photo 1 and cover photo). This island is referred to as the A-line island on the IT Logging Plan Map and it is approximately 200m long and 100m wide at its widest point. The island is located 500m upstream of the Englishman River Falls Provincial Park boundary. The island is relatively flat with gently rolling terrain.

Figure 2 A scanned portion of the Block 291312 Logging Plan Map showing the island on the Englishman River. The pink arrow shows the direction of stream flow and the blue and green dashed lines show the approximate locations of the two tree retention survey transects. The green triangles denote trees that were removed as a single piece. The red triangles denote trees that were felled and bucked prior to helicopter removal.



3. Fisheries Resource

According to the Ministry of Environment (MOE) FISS fisheries database, the Englishman River (Watershed Code 920-462800) supports anadromous fish species up to a 10m high falls located about 800m downstream of Block 291312, the falls are located approximately 15.85 km upstream of

the estuary. Fish species present in the Englishman River below these falls include chinook, chum, pink, sockeye, and coho salmon as well as steelhead, rainbow and coastal cutthroat trout.

Photo 1 Looking downstream at the A-line island on February 17, 2009 (after harvesting). The blue arrow indicates the main channel and the yellow arrow points to the side channel.

Intensive biological monitoring and habitat enhancement work has been conducted on the Englishman River downstream of the falls and this work is on-going. In the 1990s three channels were constructed. One of these channels was lost during a flood and is now part of the active river channel. The two remaining channels are referred to as the M&B Channel and the TimberWest Channel. These channels were monitored for coho smolt production for the seven years prior to 2006. It was discovered that the M&B channel produces a small number of coho smolts while the TimberWest Channel produced approximately 5,000 to 8,000 smolts each year. The length of the TimberWest Channel was increased to 4.1 km in 2006 and there are plans to monitor annual smolt output of the extended channel over the next few years.

In 2001 the Pacific Salmon Foundation released a report titled The Englishman River Watershed Recovery Plan. Since then, there has been monitoring studies and habitat enhancement work conducted by fisheries agencies as well as public involvement groups including the Mid-Vancouver Island Habitat Enhancement Society. The Englishman River has also been declared a Wild Steelhead River.

The Englishman River upstream of the falls supports resident fish species including rainbow and cutthroat trout (FISS database). Although almost all of the fish enhancement effort has focused on the portion of the river downstream of the falls, it is my understanding that some instream work has been carried out to increase bank stability upstream of the falls.

4. Description of Harvesting

Harvesting of Block 2911312, including the A-line island, had been completed by February 17, 2009, the date of the inspection. A total of 21 trees had been harvested and removed from the island (photos 2 and 3). These trees had been previously identified by IT foresters and clearly marked with aluminum tags and spray paint.

Photo 2 Looking at the stumps of two trees that were removed from the right transect (see Section 6).

Of the 21 trees removed, five were within 10 m of the edge of the side channel (photo 2) and one was within 10 m of the mainstem (Figure 2). These trees were counted in the two transect surveys that I conducted on February 17. According to the IT Logging Plan Map, ten harvested trees were between 10 and 30 m from the channels and six harvested trees were further than 30 m from the channel in a polygon between FC10 and FC11 (Figure 2 and photo 3). These totals do not include danger trees (snags) or the non-commercial trees that were cut down (see Section 7).

Logging on the island was accomplished by a helicopter selection method referred to as "single stem removal." This method involves topping and limbing the trees identified for removal. The trees are then cut almost all the way through (photo 4). These trees are left standing for a short time until a heavy-lift helicopter "grabs" on to them and lifts them upwards, breaking the holding wood (small part of the tree not cut through with the saw). The trees are then flown to a nearby drop area. The drop areas for this Block were on the 155 Mainline Road at least 100m (horizontal distance) from the river.

Photo 3 Looking at the stumps of three trees that were removed from the central portion of the island where harvesting was more intense.

Photo 4 Looking at the stump of a tree that was cut most of the way through, left standing and then picked up with the helicopter.

Approximately six of the 21 trees were too heavy to be flown in a single piece so were hand felled and then limbed and bucked (red triangles on Figure 2). The bucked sections were then flown out individually. Several danger trees (approximately six according to IT staff) did have to be felled on the island. I observed at least one large snag was retained after the Danger Tree Assessor deemed it safe to do so.

It is my understanding that one tree fell into the active side channel during helicopter yarding. This tree was knocked over by the rotor downwash and was not felled with a chainsaw. This tree was then picked up whole and flown to the landing area.

5. Pre-Harvest Assessments Conducted by IT

A Watershed Assessment Procedure assessment of the Englishman River watershed was commissioned by Weyerhaeuser Company Limited (prior to IT). The purpose of the assessment was to report on the general physical condition of the watershed, to identify impacts of past forest development activities on the condition of streams, and to provide guidance for a Prescription Team to develop management strategies for future forest operations in the watershed. The results of this assessment are contained in an IT internal report dated September 17, 2002.

It is my understanding that this report recommends streamside management and forest road prescriptions for the Englishman watershed and these prescriptions were reviewed by fisheries agency staff and various stakeholders during the Watershed Assessment Procedure process.

Block layout was conducted by Precision West Resource Consultants Limited under the supervision of IT staff. IT also retained Aztec Geoscience Inc. to conduct a site-specific terrain assessment of Block 291312. This Terrain Stability Assessment Report includes comments on channel stability based on field observations within the Block. The field assessment was conducted after the block had been laid out and the trees had been flagged for removal. The results of the terrain assessment are presented in a report dated February 2009. In summary, this report concluded that:

1. The A-line portion of Block 291312 is an alluvial island on a glaciofluvial terrace;
2. The alluvial portion of the Englishman River valley bottom (including the A-line island) requires a viable population of mature conifers to maintain natural levels of erosion resistance of the channel;
3. The island has a landslide hazard rating of very low;
4. The potential for increased windthrow is low; and
5. Due to the concern for potential long term effects on bank erosion and Large Woody Debris (LWD) recruitment, non-economic and immature trees should be retained to the fullest extent possible.

6. Riparian Tree Retention

Since the Englishman River is a Class A stream (channel width greater than 10 m and fish bearing), the Private Managed Forest Land Council Regulation 2007 (PMFLCR) requires that a minimum of 30 trees be retained adjacent to the stream channel every 100m (Section 27). Class A streams require more riparian tree retention than any other stream class. For the purpose of this assessment

the mainstem and the island side channels were considered Class A streams. Retained trees must be greater than 30 cm in diameter and be within 10 m of the edge of the stream channel provided that the pre-harvest stand contains sufficient trees[1]. The pre-harvest stand on the A-line island had sufficient trees to meet this requirement.

Two 100m long transects were surveyed on the island. The locations of the right and left (when facing downstream or north) transects are shown on Figure 2 with blue and green dashed lines respectively. The survey was conducted by counting retained trees that were greater than 30cm in diameter and were within 10m of the edge of the channel. The 100m length was measured with a hip chain and the 10m width was visually estimated. Stumps were also counted within the 100m by 10m survey transects to obtain the number of harvested trees. The results of the two transect surveys are presented in Table 1:

Table 1 Summary of riparian tree retention surveys on the Englishman River A-line island within Block 291312 conducted on February 17, 2009.

Transect	Length (m)	Retained Trees (> 30cm diameter)		Harvested Trees (> 30cm diameter)	
		Conifer	Deciduous	Conifer	Deciduous
Right (dashed blue line)	100	46	2	5 plus one danger tree	0
Left (dashed green line)	100	38	3	1	0

As can be seen in Table 1, the retention of trees greater than 30 cm in diameter was significantly more than the minimum requirement of 30 (48 and 41 trees retained for right and left transects respectively).

The total number of trees on the A-line island with a diameter greater than 30 cm is not known. It has also not been confirmed how many danger trees were cut down, or how many non-commercial trees were felled. However, based on the transect data and my visual estimate, the number of large trees (diameter > 30 cm) that were harvested is probably less than 5% of the total number of large trees present prior to logging. This is a visual estimate and a detailed inventory is required if a more accurate estimate is required by Council.

7. Non-commercial Tree and Understory Vegetation Retention

Section 30 of the PMFLCR stipulates that all non-commercial and understory vegetation must be retained within 30m of a Class A stream to the fullest extent possible. There are, however, situations described in the Regulation that allow the owner to fall and remove non-commercial trees and to disturb understory vegetation as long as their removal does not result in a material adverse effect on fish habitat or water that is diverted by a licensed waterworks intake.

[1] If the pre-harvest stand does not have sufficient trees of 30 cm or greater diameter within 10 m of the stream, the regulation describes a procedure to follow to ensure adequate tree retention.

Since the island was harvested with a helicopter, there are no roads, skid trails, cable yarding paths, etc. that could result in understory vegetation disturbance or a loss of non-commercial trees. A detailed inventory of non-commercial trees that had been cut down was not conducted. However, I did observe several non-commercial trees that had been cut down adjacent to fresh stumps and these were likely felled for safety reasons (i.e. faller escape route). It is concluded that although non-commercial trees were felled for safety reasons, non-commercial felling was not extensive. I also saw little evidence of understory vegetation disturbance except where felled tree trunks had landed (long impression on the forest floor). It is my opinion that the removal of non-commercial trees and understory disturbance will cause no significant effect on fish habitat or water quality.

8. Long Term Effect on Water Quality and Fish Habitat

Logging in the riparian area of a river has the potential to affect fish habitat in a number of ways. Some potential effects are:

1. reduced channel stability;
2. reduced nutrient and food input (leaf litter, insects, etc.);
3. reduced shade;
4. reduced long term input of large woody debris (LWD);
5. increased windthrow; and
6. increased sediment delivery and run-off.

8.1. Channel Stability

Aztec Geoscience Inc, a consulting geoscience firm, assessed channel stability in the field and reviewed the Logging Plan. The Aztec Geoscience Inc. report identified the concern about channel stability, the high transport potential of the Englishman River, and the predicted increased frequency and magnitude of peak stream flows due to climate change. The report also stated that the mature trees on the island are playing an important role in maintaining bank stability since the island is in a potential erosion zone. Their recommendation for logging on the A-line island was to retain non-economic and immature trees to the fullest extent possible.

I saw no evidence of bank disturbance due to harvesting activities and all the trees growing on the edge of the bank were retained. It is therefore my opinion that bank stability in the short term has not been significantly compromised.

Assessing whether or not tree removal will affect long term island stability is beyond the scope of this report. The long term bank stability of the island can be influenced by a number of factors not related to the harvesting on the island including the magnitude of future floods, the amount of sediment transport and storage in the channel, the formation of log jams, etc. If further analysis is required by Council a detailed assessment should be conducted by a qualified river engineer or fluvial geomorphologist.

8.2. Nutrient and Food Input

Although six of the 21 trees harvested were within 10 m of the stream channel, it is my opinion that the number of trees removed was relatively small compared to the number of trees retained. Although it is likely that at least some of the trees that were removed did contribute some nutrients and food organisms to the channel, their contribution relative to the retained trees on the island, and the riparian areas upstream of the island, would have been very small. It is therefore my opinion that nutrient and food input has not been materially affected by the removal of trees from the A-line island and that fish production in the Englishman River has not been negatively affected.

8.3. Shade

Logging on the A-line island could result in an increase in the amount of sunlight hitting the stream surface. However, the channel is deeply incised at this location and the amount of forest canopy that was removed was relatively small. It is therefore my opinion that the potential increase of solar radiation entering the stream will be insignificant and will have no measurable effect on fish production.

8.4. Large Woody Debris

Trees that fall into streams and rivers influence channel shape and play an important role in providing fish habitat. Large trees and portions of trees that enter streams are generally referred to as large woody debris (LWD). Channel size and the size of the wood influences how LWD affects channel shape. How LWD enters a stream is influenced by a number of factors including the rate of bank erosion, the age of the stand, the prevalence of windthrow, landslide potential, etc. On alluvial streams, bank erosion plays a significant role in providing LWD to the channel. On stable channels, windthrow can be the dominant mechanism for LWD input.

In general, riparian areas should be managed to ensure a supply of LWD to the channel over the long term. In theory, the removal of large trees from a riparian area has the potential to result in a reduction of LWD entering a stream channel over the long term. Research in mature/old growth forests in the Pacific Coastal Region has shown that between 50 and 80% of the LWD that enters the channel originates from trees growing within 10m from the channel edge (Naiman, et.al, 2002).

Two riparian areas were surveyed on the upstream edges of the A-line island (Figure 2). Based on the results of the transect surveys it is concluded that six of the 21 trees removed from the A-line island were within 10 m of the stream bank and none of these trees were on the channel edge. Eighty-nine trees greater than 30 cm in diameter were retained in the two 100m long transects. These retained trees have the potential to provide future LWD to the stream channel. It is therefore concluded that harvesting on the A-line island was done in a manner that will maintain future LWD input to the Englishman River.

8.5. Windthrow

Harvesting has the potential to increase the rate of windthrow, particularly at the edges of larger clear cut openings and in stands that are susceptible to windthrow. Aztec Geoscience Inc. concluded that the windthrow hazard with respect to the proposed harvesting on the A-line island was low due to the single stem removal harvesting method and due to the topographical protection offered by the deeply incised river valley. Based on Aztec Geoscience Inc.'s conclusion that windthrow hazard is low, it is concluded that it is unlikely that harvesting will influence windthrow in a manner that adversely affects fish habitat.

8.6. Sediment Delivery and Run-off

Section 15 of the PMFLCR stipulates that a forest activity must not cause sediment or other material to be deposited in fish habitat in a manner that would cause a material adverse effect. I saw no evidence of ground or stream bank disturbance that had, or would likely, result in significant sediment delivery to the Englishman River. Logging can potentially affect the rate and amount of run-off. However, this effect is generally related to roads, ground disturbance, or where a large number of trees is harvested. The removal of 21 trees (and the cutting of non-commercial trees) from the A-line island is not expected to affect run-off.

9. Summary

According to the Ministry of Environment Fisheries Information Summary System (FISS), the Englishman River supports anadromous fish species below the falls located 800 m downstream of Block 291312. Cutthroat and rainbow trout are present upstream of the falls.

A terrain stability assessment was conducted for the Block after lay-out and prior to harvesting. This assessment was conducted by Aztec Geosciences Inc. Landslide hazard, windthrow potential and channel stability were discussed in the terrain stability report. The report describes the importance of riparian trees and classes the island as alluvial. The report recommends that non-economic and immature trees be retained on the island to the fullest extent possible.

A total of 21 trees were harvested from the A-line island. These trees were single stem harvested and removed with a heavy lift helicopter. Some danger trees (snags) and non-commercial trees were cut down, likely for safety reasons. According to IT staff approximately six danger trees were felled. The number of non-commercial trees cut down is not known, but did not appear to be in excess of safety requirements.

For the purpose of this report, the mainstem channel and the side channels on the Englishman River are considered Class A stream channels (> 10 m wide). This means that a minimum of 30 trees must be retained for every 100 meters that the Block is adjacent to the channel. These retained trees must be at least 30cm in diameter. Two 10m by 100m transects were surveyed to determine tree retention in the riparian area adjacent to the river. In one transect five trees were harvested, one danger tree was felled and 48 trees (> 30cm diameter) were retained. In the second transect, one tree was

harvested and 41 trees were retained. This level of retention exceeds the minimum requirement of 30 trees per 100m.

A detailed inventory of the whole A-line island would be required to determine the exact number of danger trees and non-commercial trees felled and to accurately count the number of large trees remaining on the island. However, based on the results of the two transects and my visual estimate on February 17, the 21 harvested trees likely represents less than 5% of the total number of trees on the island.

At a certain threshold level, logging in the riparian area of an alluvial river has the potential to affect fish habitat in a number of ways. Some potential effects are: reduced channel stability; reduced nutrient and food input (leaf litter, insects, etc.); reduced shade; reduced long term input of LWD; increased windthrow; and increased sediment delivery and run-off. It is my opinion that the amount of harvesting that occurred on the island was below the threshold level where significant effects on fish habitat will occur.

Aztec Geoscience Inc. assessed channel stability in the field and reviewed the Logging Plan. Their recommendation for logging on the A-line island is to retain non-economic and immature trees to the fullest extent possible. Assessing whether or not tree removal will affect long term channel stability is beyond the scope of this report and should be conducted by a qualified river engineer or fluvial geomorphologist if further analysis is required by Council.

Due to the relatively small number of trees harvested, and lack of ground and river bank disturbance, I have concluded that fish habitat and water quality have not been significantly affected.

10. References

Naiman, Robert J., et.al. 2002. Dead wood dynamics in stream ecosystems. USDA For. Ser. Gen. Tech. Rep. PSW-GTR-181.

11. Statement of Limitations

This report was prepared for the Private Managed Forest Land Council. The material in this report reflects Shawn Hamilton and Associates best judgment in light of the information available to us at the time of preparing this report. Conclusions and recommendations in this report are based on an analysis of the best available information and professional judgement that is subject to a degree of scientific uncertainty, and therefore cannot be used as absolute fact. Shawn Hamilton and Associates has made the findings and conclusions set out in this report in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession practicing under similar conditions at the time the work was performed.

The report author believes this report to be accurate. However, he cannot guarantee the completeness or accuracy of information supplied to him. Any use which a third party, other than the parties mentioned above, makes of this report, or any reliance on, or decisions to be made based on it, are the responsibility of such third parties. The author accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken.

Original signed and sealed.