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Using FPInterface to Estimate Availability of Forest-Origin Biomass in British Columbia: Mackenzie TSA

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Abstract

Based on inventory information and a 20-year harvest queue, estimates of the amount of biomass available from forest harvest residues are estimated in $10 increments of delivered cost. For the Mackenzie Timber Supply Area, 120,000 odt/year is projected to be available at $60/odt.

Acknowledgements

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1. Executive summary

In 2011 FPInnovations used FPInterface to develop and demonstrate a method for estimating available forest-origin biomass in British Columbia's Timber Supply Areas (TSA): the test case was the Quesnel TSA. The method was subsequently refined and applied to the Williams Lake TSA (2012); the Prince George TSA (2012); and the Lakes TSA (2013), for which the results are reported here. The biomass inventory was based on 20-year harvest and road network plans for Crown land (excluding Woodlot Licenses, Tree Farm Licenses, Community Forest Agreements, and First Nations tenures) provided by the British Columbia Ministry of Forests, Lands and Natural Resource Operations. The delivery point for biomass was the town of Mackenzie. All planned blocks were assumed to be clearcut harvested, processed at roadside, and accessible to comminution operations

Forest License holder Conifex Timber Inc. expressed interested in collaborating on this analysis by supplying data from their Mackenzie operations in order to enhance or supplement the MFLNRO information. Separate analyses of specific Conifex areas were performed and these were compared to runs based on the MFLNRO data.

The results of the analysis of the Mackenzie TSA showed that small gains in efficiency can yield large gains in economic biomass volume, and that using Williston Lake, which is a large and central feature in the Mackenzie TSA, for log transportation allows about half the total biomass to become available at $60/ODT.

The analysis of available biomass supply in the Mackenzie TSA indicates an average biomass yield of 38.7 ODT/ha. This is in the form of comminuted hog fuel and comes from harvest residues only, i.e., tops, branches, and other roadside harvesting waste. Approximately 31% of this material is generated from mountain pine beetle-attacked wood, i.e., which would not be available if the lodgepole pine were healthy.

The expected biomass ratio (the ratio of recovered biomass to recovered merchantable roundwood) is 42%. This is high for typical harvesting operations, i.e., ones that do not include mountain pine beetle-killed wood, but is usual for areas with some mountain pine beetle infestation.

Because of the efficiency of grinding operations has improved in recent years, two price points for grinding were tested: $20.48/ODT, representing optimistic conditions; and $27.27/ODT, representing the typical conditions of the time. At an economic price of $60/ODT for hog fuel delivered to the town of Mackenzie, the $20.48/ODT grinding scenario predicted a total of 3.6 million ODT over the 20-year harvest horizon (180 000 ODT/year) and the $27.27/ODT scenario predicted a total of 2.4 million ODT or 120 000 ODT/year.

This difference shows the sensitivity to small gains in grinding efficiency. A further 25% more volume would be available at $70/ODT ($20.48/ODT grinding scenario, optimistic conditions). There was a noticeable difference in the amounts of biomass available at $60/ODT for each grinding cost scenario. Much of the biomass available at $70/ODT at the higher grinding cost would be available at $60/ODT at the lower grinding cost. If further efficiencies could be realized even more biomass can be available. Gains in potentially available biomass began to tail off after the cost of biomass reaches $80 or $90/ODT.

We used data provided by Conifex Timber Inc., one of several licensees in the TSA, to perform some separate analyses of specific Conifex areas and these runs were compared to ones based on the MFLNRO data for the Mackenzie TSA. The comparison showed that the Conifex biomass harvest projection contained more spruce than lodgepole pine, while the MFLNRO projection contained more lodgepole pine. The Conifex blocks were spread further afield and occurred only in Conifex-designated areas. Although the total Conifex harvest was predicted to be 44% of the MFLNRO's total projected harvest, the amount of available Conifex biomass at $60/ODT was only about 29% of the MFLNRO's available biomass.

2. Introduction

In order to progress toward full implementation of a bioeconomy in British Columbia a key piece of information is needed—i.e., a detailed inventory of economically available biomass.

To address this need, in 2011 FPInnovations undertook a project in partnership with the Inventory Branch of the British Columbia Ministry of Forests, Lands and Natural Resource Operations (MFLNRO). The specific goals of the project were to develop a process for calculating biomass inventories in Timber Supply Areas in the Central Interior. The projections of biomass availability were based on 20-year harvest and road network plans for Crown land (excluding Woodlot Licenses, Tree Farm Licenses, Community Forest agreements, and First Nations tenures) provided by the MFLNRO.

In 2011 FPInnovations developed a method for estimating and projecting available forest-origin biomass in British Columbia's Timber Supply Areas (TSA), using FPInterface: the test case was the Quesnel TSA (Friesen & Goodison, 2011). In 2012 this method was refined and applied to the Williams Lake TSA (Friesen, 2012a), the Prince George TSA (Friesen, 2012b), and the Lakes TSA (Friesen, 2012c). An analysis of the Mackenzie TSA was run in 2013, for which the outcomes are reported here. The aim in providing this information is to help decision makers better understand biomass availability when preparing industrial proposals.

Detailed introductory statements describing the background and rationale of this project and the greater project as a whole are in Friesen & Goodison (2011).

One of the Forest License holders in the Mackenzie TSA, Conifex Timber Inc., expressed interested in collaborating on the project by supplying data from their Mackenzie operations, in order to enhance or supplement the MFLNRO information. Separate analyses of specific Conifex areas were performed and these were compared to runs based on the MFLNRO data.

3. Objectives

As abridged from the report about the Quesnel TSA (Friesen & Goodison, 2011) the objectives were to:

Calculate biomass supply for volume-based tenures in the Mackenzie Timber Supply Area (TSA) for a 20-year period. The specific deliverables included:

a. An analysis showing the delivered cost of biomass from point of origin

b. An analysis showing the amount of biomass delivered at different price points—The market value of 1 oven-dried tonne (ODT) of biomass was not clear at the time, but $60 was set as the agreed-upon threshold at which to determine commercial biomass availability.

4. Methods

Overall process

The basic methodology for determining the biomass supply in the Central Interior was established during analyses of the Quesnel TSA (Friesen & Goodison, 2011) and the Williams Lake TSA (Friesen, 2012a). It is reviewed below.

The analysis focused on the TSA and was based on polygon data (tree characteristics) and a road data set supplied by the MFLNRO. It did not include any nearby Woodlot Licenses, Tree Farm Licenses, Community Forest Agreements, or any First Nations tenures because the inclusion of some of these areas could have altered the available supply of biomass.

Additionally, stands considered unmerchantable due to small stem size were not included in the analysis. The analysis focused on recovering harvest residues from merchantable stands. However, purposely harvesting unmerchantable stands for biomass could add to the biomass supply and further analysis could be undertaken to determine its profitability.

The process map in Figure 1 graphically displays the steps taken to build the final inventory of economically available biomass for the Quesnel TSA (Friesen & Goodison, 2011). The same method was used for this analysis of the Mackenzie TSA.

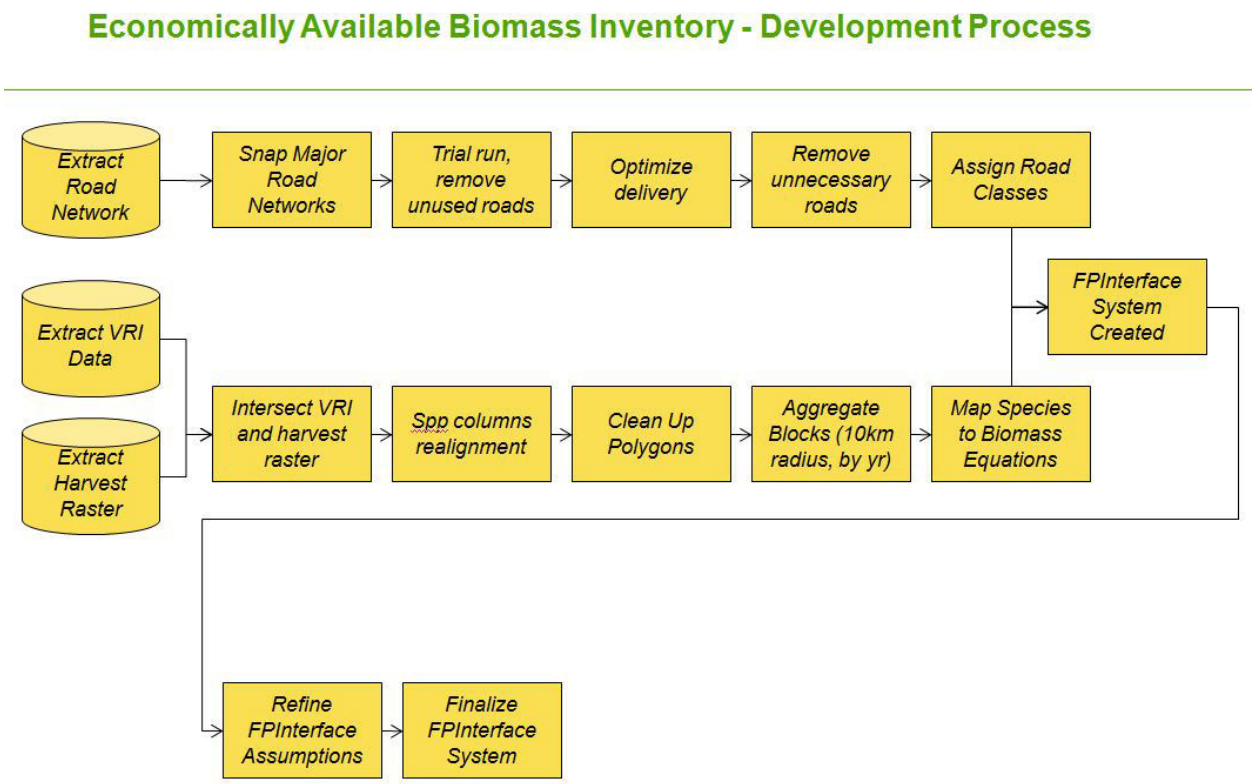


Figure 1. Steps in the method for building the final inventory of economically available biomass.

Data acquisition

Data layers for the Mackenzie TSA (excluding Woodlot Licenses, Tree Farm Licenses, Community Forest Agreements, and First Nations tenures) were acquired from the MFLNRO. The data included Vegetation Resources Inventory polygons with attributes, and road linework with attributes. The polygon data covered 20 years of harvest over four consecutive 5-year periods.

The 20-year harvest raster is a point-in-time snapshot. It indicates which polygons are expected to be harvested over the 20 years. No attempt was made to model possible growth or mortality during the 20-year horizon. Any projections of growth or mortality were already accounted for in the harvestable proportion contained in the harvest raster data.

Road network data were acquired from both Conifex and the MFLNRO. The Conifex road network contained less detail and was thought to unduly shorten cycle times and/or isolate blocks such that no delivery pathway could be found. Therefore the MFLNRO road network was used for the analysis of the MFLNRO and the Conifex polygons (separate reports). The use of the same road network for both reports allowed greater comparability in cost comparison, and it focused the analysis of differences on polygon attribute data.

Data transformation

FPInterface requires two major inputs—a polygon layer of harvestable blocks with attributes, and a road layer. The polygon layer must also have a harvest raster built into it, indicating which polygons are

to be cut in which time period. To calculate biomass amounts, FPInterface requires both tree size data (height and dbh) and either stand density (stems per ha) or volume per hectare by species in each polygon. When the polygon layer is uploaded it is necessary to tie species in the resultant to the species present in FPInterface.

In order to speed up the calculation, polygons with little or no merchantable volume were targeted for elimination. Polygons with no volume were removed from the resultant. Some of these polygons resulted from the process of intersecting the Vegetation Resources Inventory and the harvest raster layers. Aggregation rules meant blocks were grouped if they had identical harvest years and were within a 10 km radius.

FPInterface calculates cost in part by finding a transport route from the product origin in a polygon (block) to the mill or delivery site. It relies on a continuous path along the road network. If digital road segments are not joined together (snapped) the program is not able to find a path between the block and the mill, or it may find a sub-optimal circuitous path. Examination of the data set showed that a great deal of road snapping was required.

Biomass equations

To perform the analysis, tree species indicated in the inventory are tied to single-tree biomass equations in FPInterface. These equations were based on “Canadian national tree above ground biomass equations” (Lambert et al, 2005). Although this equation set includes trees from all across Canada, including western and northern Canada, there were very few samples from British Columbia. More recently, Ung et al. (2008) have released tree equations for British Columbia (accepted by the MFLNRO) and these were incorporated into FPInterface for all the analyses performed after the initial one (Quesnel TSA).

FPInterface parameters

Tree species associations

Species associations were made as shown in Table 1.

Table 1. Tree species associations

Conifex species	FPInterface biomass equation
cottonwood	black cottonwood
aspen	trembling aspen
subalpine fir	alpine fir
white birch	white birch
Douglas-fir	Douglas-fir (Interior)
tamarack	western larch
larch	western larch
pine	lodgepole pine
spruce	white spruce
white spruce	white spruce
Engelmann spruce	white spruce
hybrid spruce	white spruce
black spruce	black spruce

Road classes

Unlike the dataset used in the analysis of the Quesnel TSA (Friesen & Goodison, 2011), there were no road classes contained in the road data set for the Mackenzie TSA. However, FPInterface has the ability to assign road classes based on the amount of volume hauled over each section of road. The volume hauled is for merchantable volume as calculated by FPInterface. The volume and speeds associated with each road class were assigned as listed in Table 2.

Table 2. Road class associations

FPInterface road class	Volume		Road speed		
	Minimum (m3)	Maximum (m3)	Posted speed (km/h)	Empty haul [a] (km/h)	Loaded haul [b] (km/h)
Paved	5 000 001	50 000 000	90	86	77
Class 1	1 000 001	5 000 000	70	67	60
Class 1 (off highway)	0	0	70	67	60
Class 2	500 001	1 000 000	50	48	43
Class 3	100 001	500 000	40	38	34
Class 4	50 001	100 000	20	19	17
Class 4 (operational)	0	0	20	19	17
Class 5 (winter)	0	50 000	20	19	17

[a] 95% of posted speed. [b] 85% of posted speed.

General parameters

The price of fuel can have significant impacts on model results. Some equipment in the model can use diesel and while other equipment is eligible for marked fuel. A price of $1.25/L was assigned, which was near to commercial rates for diesel, but slightly higher than the price of marked fuel at the time.

The program's default values for productivities and costs of forestry equipment rely on a long history of FPInnovations studies and on other information gathered by FPInnovations. If users have specific values or costs they wish to apply to any phase or machine, these can be used instead of the defaults. For this project, only the default values were used. To verify their suitability the default values were compared with the machine costs listed in the *Interior Appraisal Manual* and were found to be close approximates.

Based on a terrain classification system developed by the Canadian Pulp and Paper Association (CPPA) (Mellgren, 1980), average slope for the Mackenzie TSA was assigned to CPPA Class 4 (33 to 49%). Ground strength was rated as CPPA Class 2 (good), and ground roughness was rated as CPPA Class 2 (slightly even).

Comminution cost

Working time for British Columbia conditions was based on previous base case studies, consisting of one 12-hour shift/day, 200 days/year. Grinder efficiency was set at 60%, and the amount of fuel used per productive machine-hour for the grinder was the standard 135 L/PMH. These are the standard base case parameters used in past FPInnovations studies and are included for ease of comparison to those studies. In this study, these parameters produce a grinding cost of $27.27/ODT on moderate ground. However, recent developments in the industry have led to a lower grinding cost of about $20/ODT, therefore the parameters were changed in a low-cost grinding scenario to 75% efficiency and fuel use of 70L/PMH, in order to represent the new conditions. Thus the grinding cost was $20.48/ODT which was thought to be achievable by an experienced operator in the conditions of the Mackenzie TSA.

Topping diameter

Although British Columbia regulations require a topping diameter of 10 cm for most merchantable species, this analysis used 12.5 cm in order to reflect more common industrial practise. Topping diameter has a significant impact on the volume of a tree available for biomass use.

Utilization of lodgepole pine and mountain pine beetle-attacked wood: considerations

The harvesting of standing trees for biomass purposes is not generally considered economic in British Columbia because their recovery must cover the full costs of planning, developing, and harvesting of the stands, in addition to costs for biomass recovery[1] operations. However, because of mortality due to the mountain pine beetle infestation of lodgepole pine in the Interior, some whole logs were included for biomass chipping. Although the timber harvesting land base (THLB) proportion attribute includes mortality attributed to mountain pine beetle infestation, because of continuing attack by the beetle and the resulting degradation of logs, 30% of lodgepole pine volume was removed from availability as merchantable volume. Half of this (15% of total lodgepole pine volume) was estimated to be available for whole-log chipping or grinding at roadside, and the remainder was counted as loss (Figure 2).

One part of the methodology was changed from the biomass calculations made in the preceding reports in this series of studies (Friesen & Goodison, 2011; Friesen, 2012a, 2012b, 2012c). When 15% of total pine sawlogs is indicated for conversion to biomass, FPInterface assigns *harvest* costs as part of the acquisition of this biomass. However, because none of the biomass in this analysis is actually purposely harvested biomass, any costs attributed to obtaining biomass from mountain pine beetle whole-trees were reduced by $70/ODT, and the “Merchantable volume” was added to the “Residues” volume to produce Table 3. This increases the amount of biomass available at each price point. $70/ODT was the chosen amount by which to reduce costs so that the maximum cost for acquiring “Merchantable volume” would match the maximum cost for acquiring “Residues,” i.e., $120/ODT, and approximate the cost for harvest converted to ODT.

For example, Table 3 presents the FPInterface output at $27.27/ODT for grinding. However, the amount put forward in this report (in the Results section, below) is 2 359 944 ODT available at $60/ODT. This is achieved by adding the “Residues” amount at $60 (i.e., 1 597 187) to the “Merchantable volume” amount at $130 (i.e., 762 757). This is thought to be a fair representation of what would actually be achievable for $60/ODT (at a grinding cost of $27.27/ODT).

In Figure 3, the volume obtained from mountain pine beetle-attacked wood (15% of total lodgepole pine) has harvest costs attributed it according to the old method. In Figure 4 these costs are reduced by $70 to reflect actual practise: Figure 4 is thought to be more representative of actual conditions.

[1] biomass recovery = comminution plus transport of harvest residues

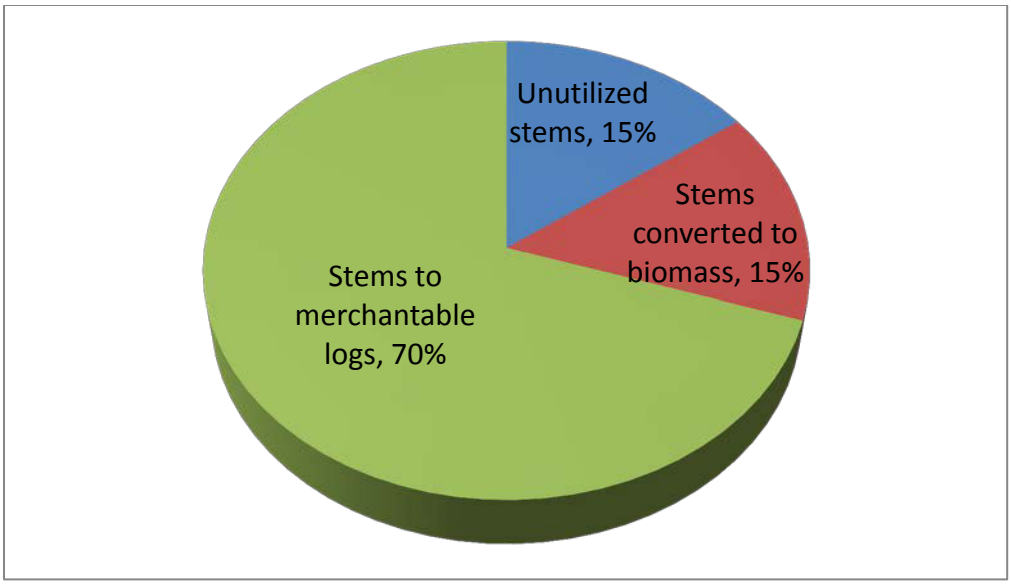


Figure 2. Utilization of mountain pine beetle-affected lodgepole pine stems: standards used in the analysis.

Table 3. Cost-availability of biomass, at $27.27/ODT

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	44,072.3	44,072.3
40 $/odt	0.0	84,543.1	84,543.1
50 $/odt	0.0	496,711.3	496,711.3
60 $/odt	0.0	1,597,187.3	1,597,187.3
70 $/odt	0.0	2,696,849.0	2,696,849.0
80 $/odt	0.0	3,270,622.9	3,270,622.9
90 $/odt	120.2	3,702,443.7	3,702,564.0
100 $/odt	15,000.7	3,960,604.0	3,975,604.6
110 $/odt	46,482.1	4,097,337.4	4,143,819.6
120 $/odt	199,093.9	4,099,237.3	4,298,331.2
130 $/odt	762,756.8	4,099,237.3	4,861,994.1
140 $/odt	1,237,183.3	4,099,237.3	5,336,420.6
150 $/odt	1,471,598.1	4,099,237.3	5,570,835.4
160 $/odt	1,669,322.6	4,099,237.3	5,768,559.9
170 $/odt	1,778,644.1	4,099,237.3	5,877,881.4
180 $/odt	1,851,493.2	4,099,237.3	5,950,730.5
190 $/odt	1,853,274.9	4,099,237.3	5,952,512.2
Maximum cost	**186.62 $/odt**	**112.49 $/odt**	

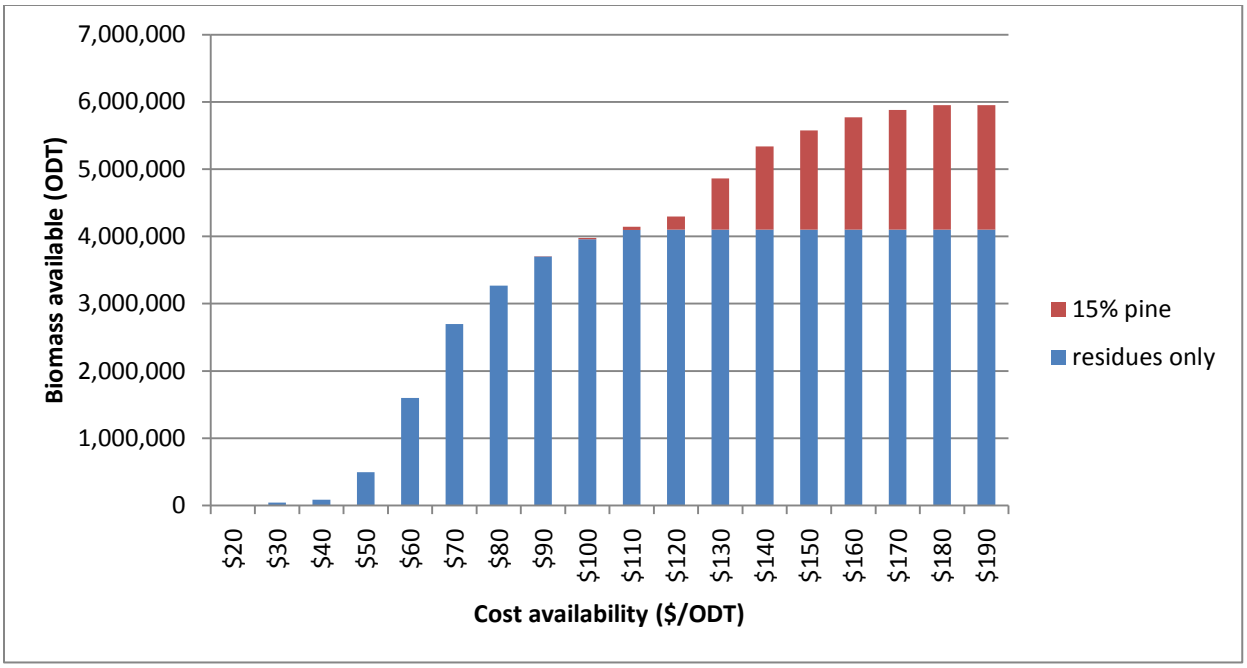


Figure 3. Cost availability of biomass in the Mackenzie TSA: former method of accounting for extra lodgepole pine waste created due to some wood being degraded by the mountain pine beetle infestation.

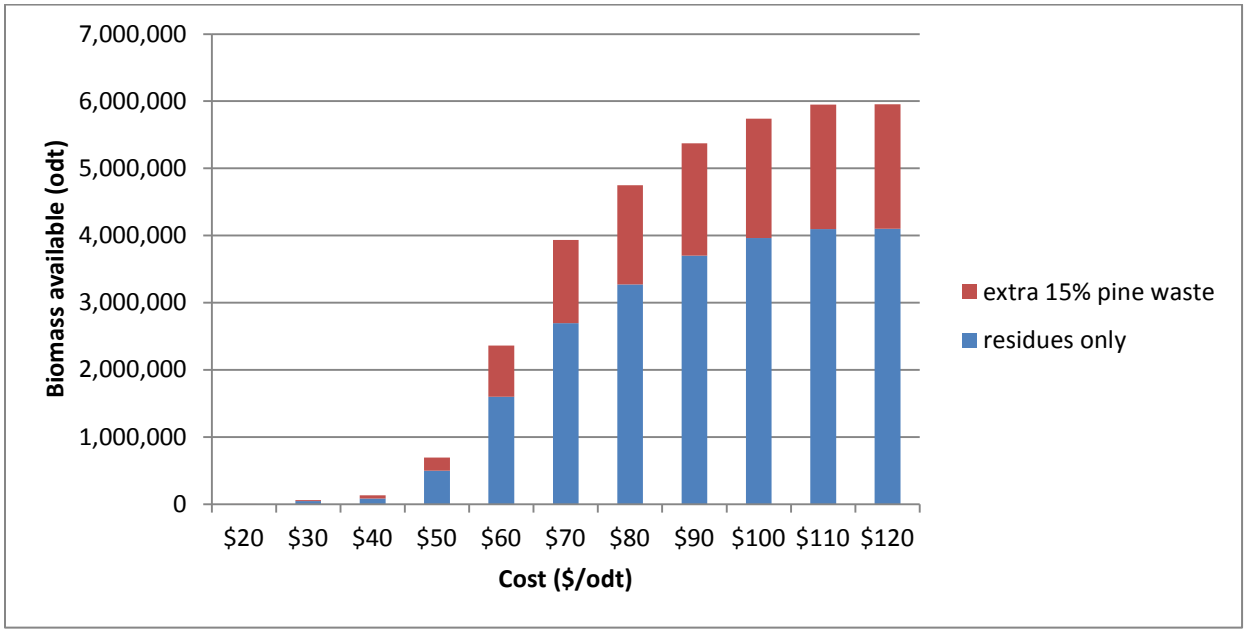


Figure 4. Cost availability of biomass in the Mackenzie TSA: improved method of accounting for extra lodgepole pine waste created due to some wood being degraded by the mountain pine beetle infestation.

Time frame

The harvest period data were in four 5-year periods, for a total of 20 years of harvest.

Parameters as entered into FPInterface

Table 4 presents a summary of some of the parameters as entered into FPInterface, at a grinding cost of $27.27/ODT. At a grinding cost of $20.48, the grinder efficiency was adjusted to 75% and grinder fuel use was adjusted to 70 L/PMH.

Table 4. FPInterface parameters

Run descriptor	Grinding at $27.27/ODT
run name	MinBlk MinRd - 3May2013-manson
output name	MinBlk MinRd - 3May2013-manson
block system	MinFinal
road system	TSA16_roads4
transfer yard(s)	E Bear Valley, Bear Valley, Nabesche, Finlay Forks, Ospika, S Fort Grahame, Fort Grahame, Chowika, Deserters, Isola, Ingenika, Swannell, Factor Ross, Pete Toy, Chunamon, Raspberry, Mesilinka, Omineca, Mackenzie
cost per transfer yard, respectively	7.5, 7.5, 7.5, 7, 7.5, 7.5, 7.5, 8, 8, 8, 8, 8, 7.5, 7.5, 7.5, 7, 7, 7, 0
year(s) analyzed	All
species attribute linking	BC
automatic assignment of road class by volume	Yes
road maintenance	Yes
haul speeds	Graduated
haul speeds at 95% / 85% of posted	Yes
transport shifts / day	1
transport hours / shift	12
transport days / year	200
transport fuel price $/litre	1.25
ground strength	2 – good
ground roughness	2 – slightly even
average slope	33-49
slash used for biomass	Yes
full stem used for biomass	No
Pl utilization of THLB merchantable timber (%)	70
Pl unutilized merchantable used for biomass (%)	15
Pl stems for biomass chipped where?	Roadside
Pl merchantable stemwood for biomass directed where	closest yard
chips destination	closest yard
topping diameter	12.5 cm
truck used for chips	3-axle
truck used for logs	B-train
harvesting fuel price / litre (x3)	$1.25
harvesting shifts / day (x3)	1
harvesting hours / shift (x3)	12
harvesting days / yr (x3)	200
harvesting system	full tree with roadside processing
felling & processing	mechanized and bunched
skid type	skidder with grapple
type of roadside processing	cut-to-length
on site biomass treatment (roadside)	comminution
recovery season	winter
slash freshness	fresh
slash pre-piled at roadside	Yes
grinder size type	horizontal 600 kW
biomass fuel price / litre (x2)	$1.25
biomass hours / shift (x2)	12
biomass shifts / day (x2)	1
biomass days / yr (x2)	200
grinder efficiency (%)	60 [a]
grinder fuel use (L/PMH)	135 [a]
indirect costs - biomass ($ value)	$0.00
indirect costs - harvesting ($ value)	$0.00

[a] At a grinding cost of $20.48, the parameters highlighted in yellow were adjusted to 75% and 70 L/PMH.

Delivery locations

Because it has the largest population in the TSA and is the site of existing mills, the town of Mackenzie was used as the delivery point for biomass. The presence of Williston Lake, which is a large and dominant feature in the Mackenzie TSA, means that forest products can be transported from distant locations by water for costs significantly less than hauling on roads.

Biomass delivery points (transfer yards) were designated at log dumps along the lake. Then a cost to deliver the biomass from that dump to Mackenzie was added to the costs required to deliver the comminuted biomass to the dump. Costs include unload, reload, lake tow, and de-watering. The costs associated with lake transport for the different dumps are shown in Table 5.

Whether or not the analysis should include the Manson dump as a potential route for material to the mill was debated, but in the end it was excluded. In current practise, logs are transported down the mainline (Finlay FSR) instead of via the dump, a feat made possible by the existence of a causeway across the lake. This suggests that this is the most cost-effective method for transport. Whether or not this produces the lowest stumpage has not been confirmed by the MFLNRO at the time of writing; however, this report reflects industry practise and excludes Manson dump.

Table 5. Cost of water transportation of biomass, by log dump

Log dump	Cost ($/ODT)
Deserter's	8
Isola	8
Ingenika	8
Swannell	8
Chowika	8
Pete Toy	7.50
Fort Grahame	7.50
South Fort Grahame	7.50
Ospika	7.50
Factor Ross	7.50
Chunamon	7.50
Bear Valley	7.50
East Bear Valley	7.50
Nabesche	7.50
Finlay Forks	7
Raspberry	7
Mesilinka	7
Omineca	7

Biomass calculations

The biomass calculations in FPInterface produce an amount of total available biomass once merchantable roundwood has been removed. For this project, only biomass transported to roadside was considered recoverable, and biomass likely to remain at the stump or dispersed on the cutblock was not. Once it is transported to roadside, some biomass becomes unavailable due to handling and technical losses. The remainder is considered recovered biomass. Figure 5 shows this breakdown with the numbers from the 20-year harvest of the low-cost grinding scenario, at a grinding cost of $20.48/ODT.

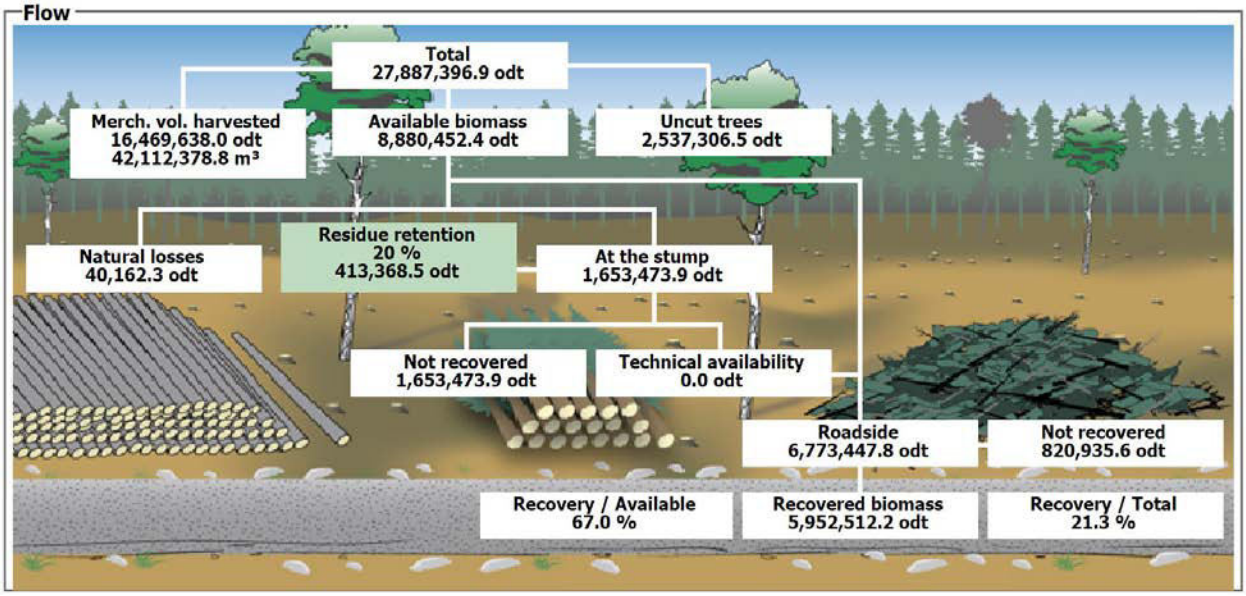


Figure 5. Recoverable biomass in the Mackenzie TSA, at a grinding cost of $20.48/ODT.

5. Results and discussion

Summary—key results

The FPInterface analysis of biomass supply in the Mackenzie TSA, which was based on inventory information and the road network supplied by the MFLNRO, indicated an average biomass yield of 38.7 ODT/ha. This was in the form of comminuted hog fuel, derived from harvest residues only, i.e., tops, branches, and other roadside harvesting waste. Mill residues are not predicted by the model.

Approximately 31% of this material was obtained from mountain pine beetle-affected wood in excess of what would be generated if the pine were healthy. This means 26.7 ODT/ha were derived from normal harvesting waste, and an additional 12 ODT/ha comprised extra material which was available due the mountain pine beetle infestation of lodgepole pine (Figure 6), averaged over all cutblocks in the study.

Looking at the yield period by period (Figure 7), the first two 5-year periods expect greater yield per hectare than the last two periods, probably owing to the availability of a greater amount of mountain

pine beetle-affected wood in the first two periods. The greater presence of pine in the first two periods means more material is calculated as waste (usable for biomass), because mountain pine beetle-killed trees yield more waste than healthy trees.

The biomass ratio (the ratio of recovered biomass to recovered merchantable roundwood) (Table 6) is 41.8% when both values are expressed in the same units. In this case, 14 223 964 ODT of roundwood and 5 952 512 ODT of biomass are expected. Expressing this volumetrically for roundwood, 36 413 347 m^3 of roundwood are expected[2] and the biomass ratio expressed in heterogeneous units (ODT of biomass/m^3 of roundwood) is 12.5%. This is high for typical harvesting operations that do not include mountain pine beetle-killed wood, but low for mountain pine beetle-infested areas; it represents a weighted average of both as distributed in this harvest queue.

When biomass supply studies were begun for the MFLNRO two years ago, the typical grinding cost was about $30/ODT. However, recent advances in operational efficiency have lowered the grinding cost to about $20 to 25/ODT. Therefore, two scenarios were analyzed, each with a different grinding cost. Key results from the runs for 20 years of harvest, and grinding costs at $20.48/ODT and at $27.27/ODT, are summarized in Tables 7 and 8. More detailed results are shown in Appendix 1.

The results for the different grinding costs are compared in Figure 9.

Note the significant difference in the amounts available at $60/ODT for each grinding cost. Much of the biomass costing $70/ODT at the higher grinding cost is available at $60/ODT at the lower grinding cost. If further efficiencies could be realized, even more biomass would be available. Gains in potentially available biomass tail off significantly after $80 or $90/ODT.

The total biomass available at any price point from harvest residues and mountain pine beetle waste (the portion deemed recoverable) over the next 20 years was projected to be 5.95 million ODT. At a grinding cost of $20.48/ODT about 3.6 million ODT (or approximately 180 000 ODT/year) would be available for $60/ODT. At a grinding cost of $27.27/ODT the amount of biomass available would be about 118 000 ODT/year at a $60/ODT price point.

What is very significant here is that half the total amount of biomass in the TSA is available for $60/ODT (approximate average of the grinder cost scenarios). This is almost certainly because the transportation of wood on the lake allows far-flung areas to be accessed for reasonable cost. This level of biomass availability was not observed in the other TSAs where only a quarter or less of the total possible biomass was available at $60/ODT (Friesen & Goodison, 2011; Friesen, 2012a, 2012b, 2012c).

If the acceptable price of delivered biomass rose to $70/ODT, then available biomass would be about 25% greater at a $20.48/ODT grinding cost, and about 67% greater at a $27.27/ODT grinding cost.

Figure 10 shows biomass availability at $60/ODT for each period.

[2] As shown in the Forest Supply report for either scenario, p.8. (Appendix 1, Section 1.1). Conversion to m^3 is achieved by dividing by 2.56, which is the weighted average ratio for all species as shown in the ratio on the flow diagram for merchantable volume harvested, Figure 5.

Again, the difference in available amounts at each grinding cost is highlighted by the differences in the bar heights by colour. In general, much more biomass is available at the lower grinding cost. The difference is smaller in period 4, likely because there are consistently longer distances from the blocks to the delivery points.

It is interesting that there is not a falldown in biomass availability at $60/ODT across the periods. There is a slight drop in total biomass available during the periods, possibly due to mountain pine beetle, (Figure 11), but the trend for stability at $60/ODT suggests that the harvest planned at locations within the $60/ODT radius does not decrease. This is not typical of the other TSAs we have modelled.

An isometric map of harvest blocks by biomass cost is presented in Figure 12. Note that the map averages the cost of biomass from roadside residues with the cost from mountain pine beetle stems (as calculated by the program).

In general, the blocks closest to the delivery point have the lowest delivered costs and blocks furthest from the mill are the most expensive. Blocks which are close to the lake and benefit from water transportation can remain cost-effective at distances from the mill not usually realized in land-bound TSAs.

Figure 13 provides a more detailed look at one portion of the TSA. Some blocks quite far from the mill in Mackenzie were calculated to be reasonably affordable for biomass extraction if they can access a log dump on the lake. In this figure color gradation based on distance from the mill is more visible.

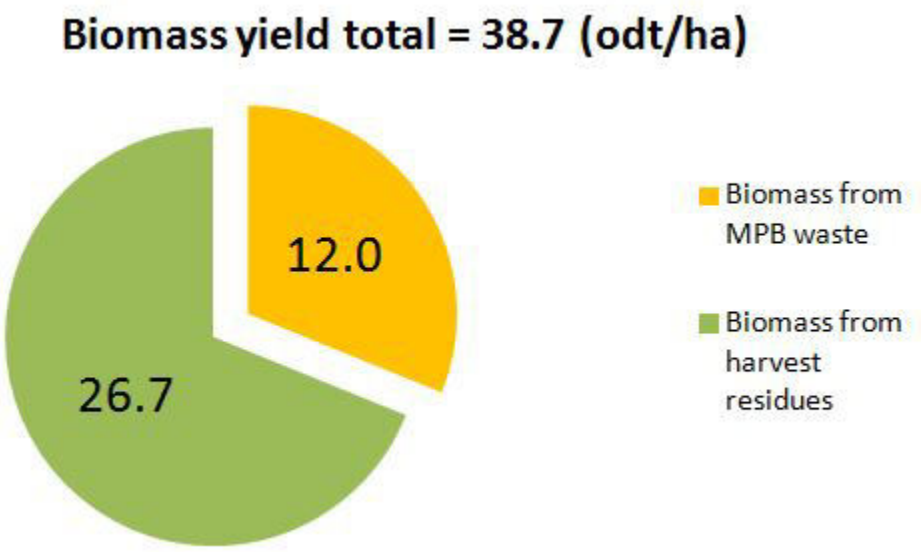


Figure 6. Projected biomass yield (ODT per hectare).

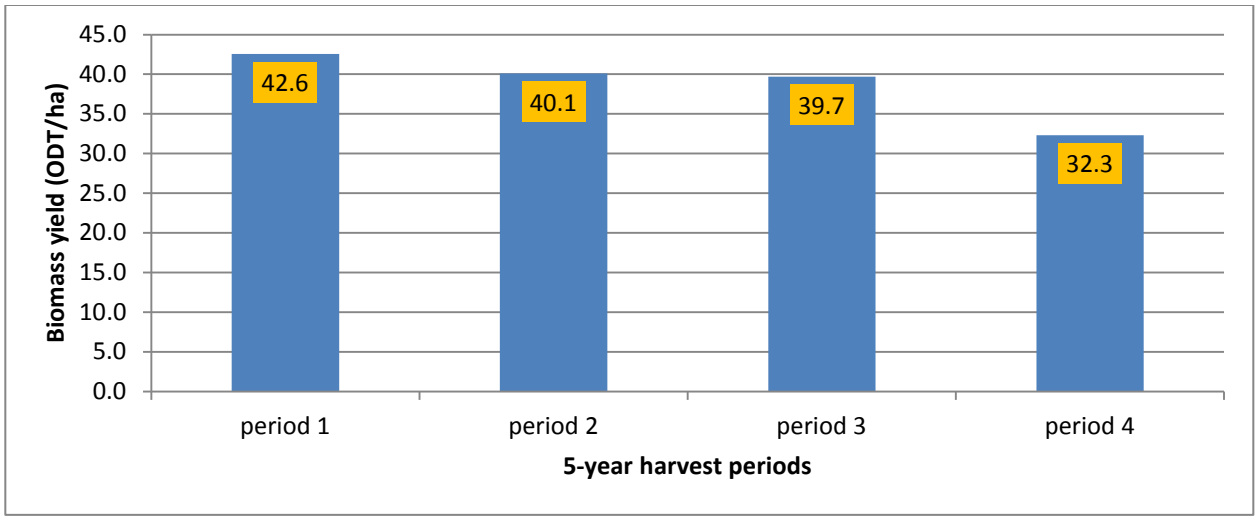


Figure 7. Availability of biomass in the Mackenzie TSA, by 5-year period. Average = 38.7 ODT/ha.

Table 6. Calculation of biomass ratio

Biomass Ratio		Biomass Ratio	
5,952,512	odt of biomass	5,952,512	odt of biomass
14,223,964	odt of roundwood	36,413,347	m^3 of roundwood
= 41.8%	odt / odt	= 16.3%	odt / m^3

Figure 8. Pile of biomass adjacent to a power plant in the Interior British Columbia.

Table 7. Cost availability of biomass in the Mackenzie TSA: comparison of two grinding scenarios

Cost ($/ODT)	Volume of biomass available at a grinding cost of $20.48/ODT		Volume of biomass available at a grinding cost of $27.27/ODT	
	Total available (ODT)	Available annually (ODT/year)	Total available (ODT)	Available annually (ODT/year)
30	83 729	4 186	59 073	2 954
40	469 035	23 452	131 025	6 551
50	1 601 517	80 076	695 805	34 790
60	3 604 983	180 249	2 359 944	117 997
70	4 516 075	225 804	3 934 032	196 702
80	5 199 563	259 978	4 749 221	237 461
90	5 629 228	281 461	5 371 766	268 588
100	5 890 053	294 503	5 739 248	286 962
110	5 952 512	297 626	5 948 831	297 442
120	-	-	5 952 512	297 626

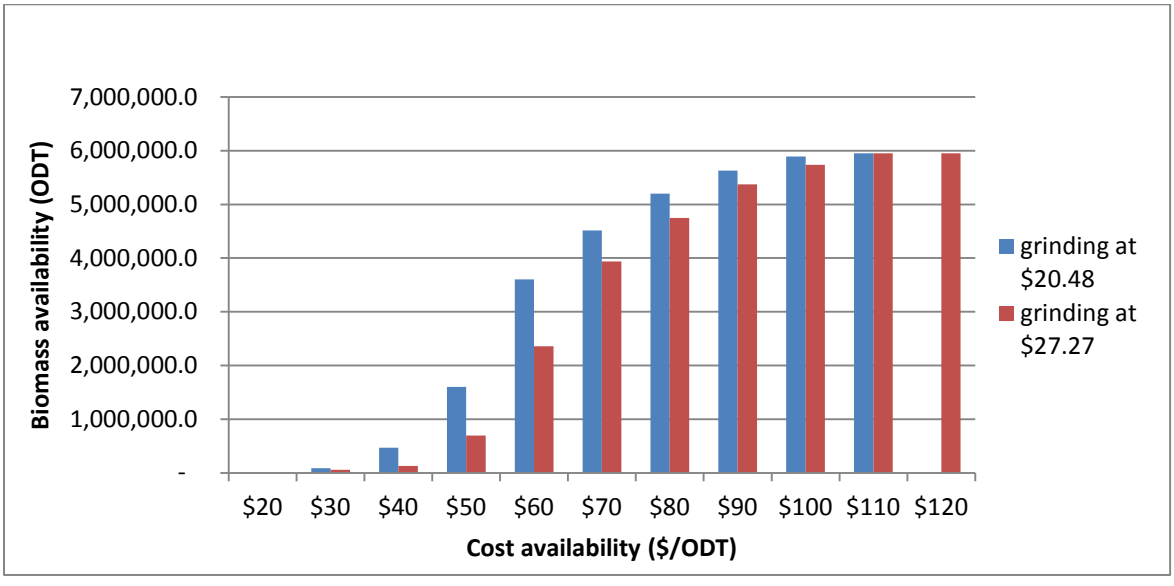


Figure 9. Availability of biomass in the Mackenzie TSA, by grinding cost: 20-year scenario.

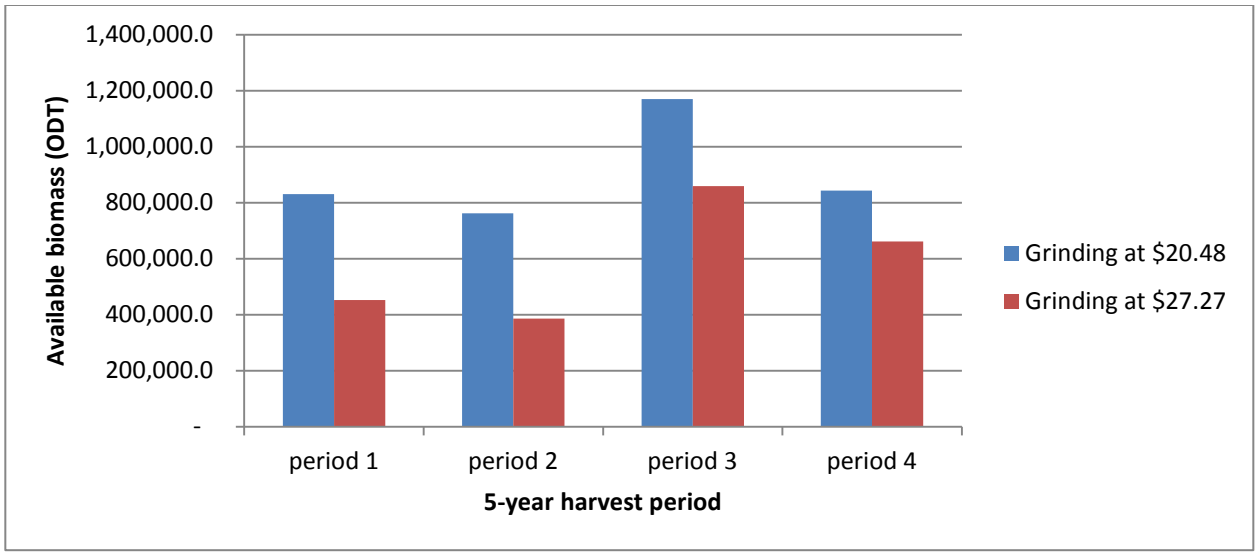


Figure 10. Availability of biomass in the Mackenzie TSA, by 5-year period, at $60/ODT.

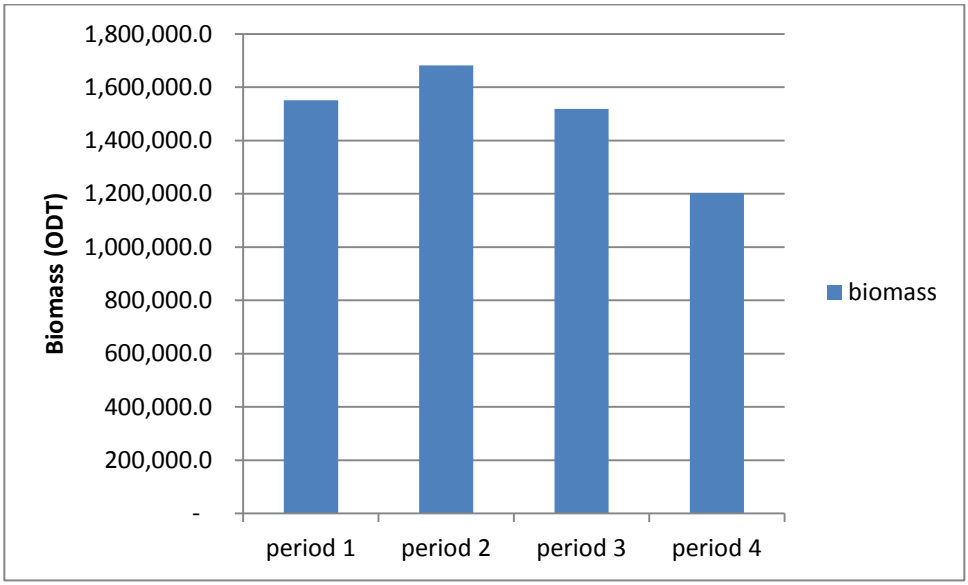


Figure 11. Total availability of biomass from harvesting in the Mackenzie TSA, by 5-year period.

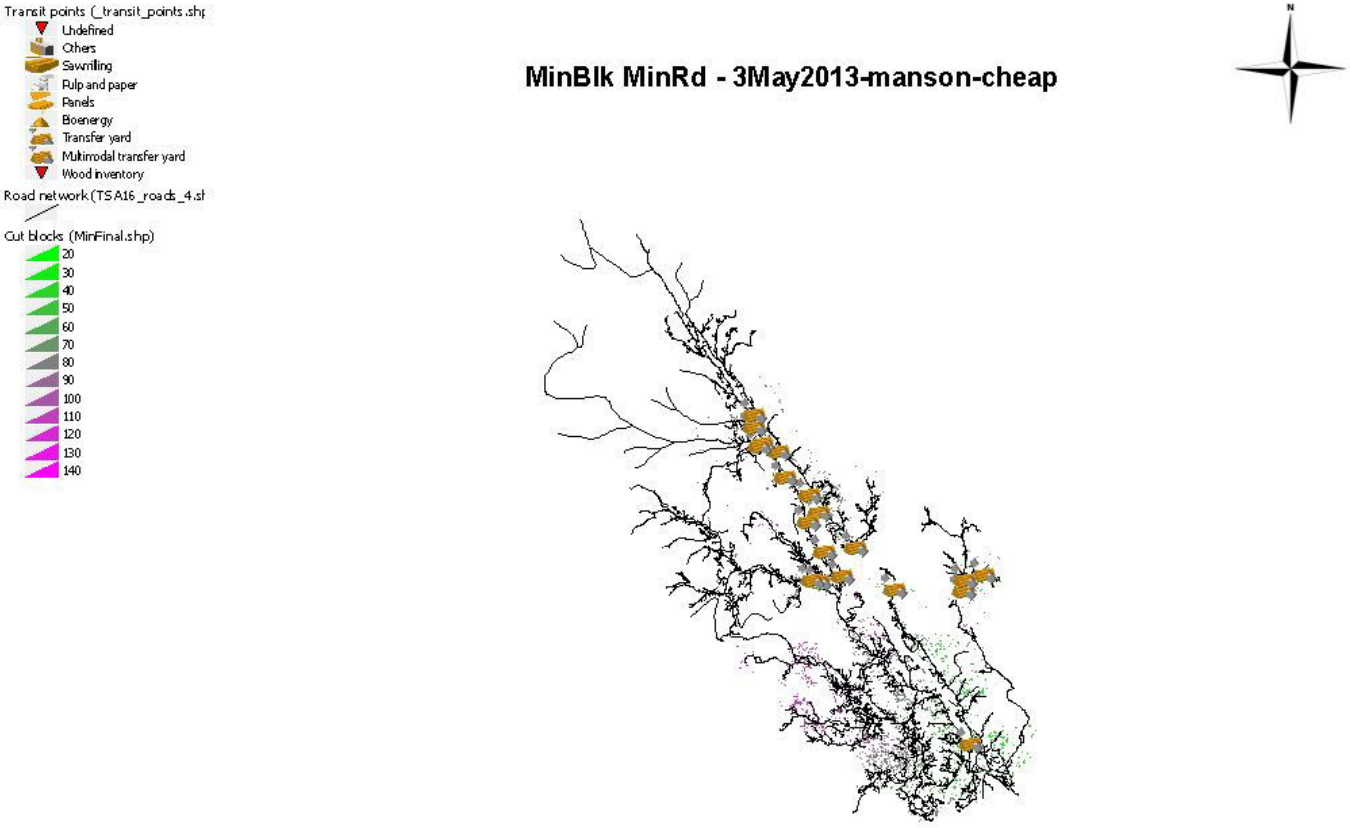


Figure 12. Cost of delivered biomass from point of origin to the town of Mackenzie in increments of $10/ODT. Blocks with the lowest delivered costs are the greenest in colour. The most expensive blocks are violet in colour. The brown log piles represent log dumps on the lake, and the southernmost one is the mill at Mackenzie. The colour scale represents estimated cost ($/ODT) of delivered biomass from that block.

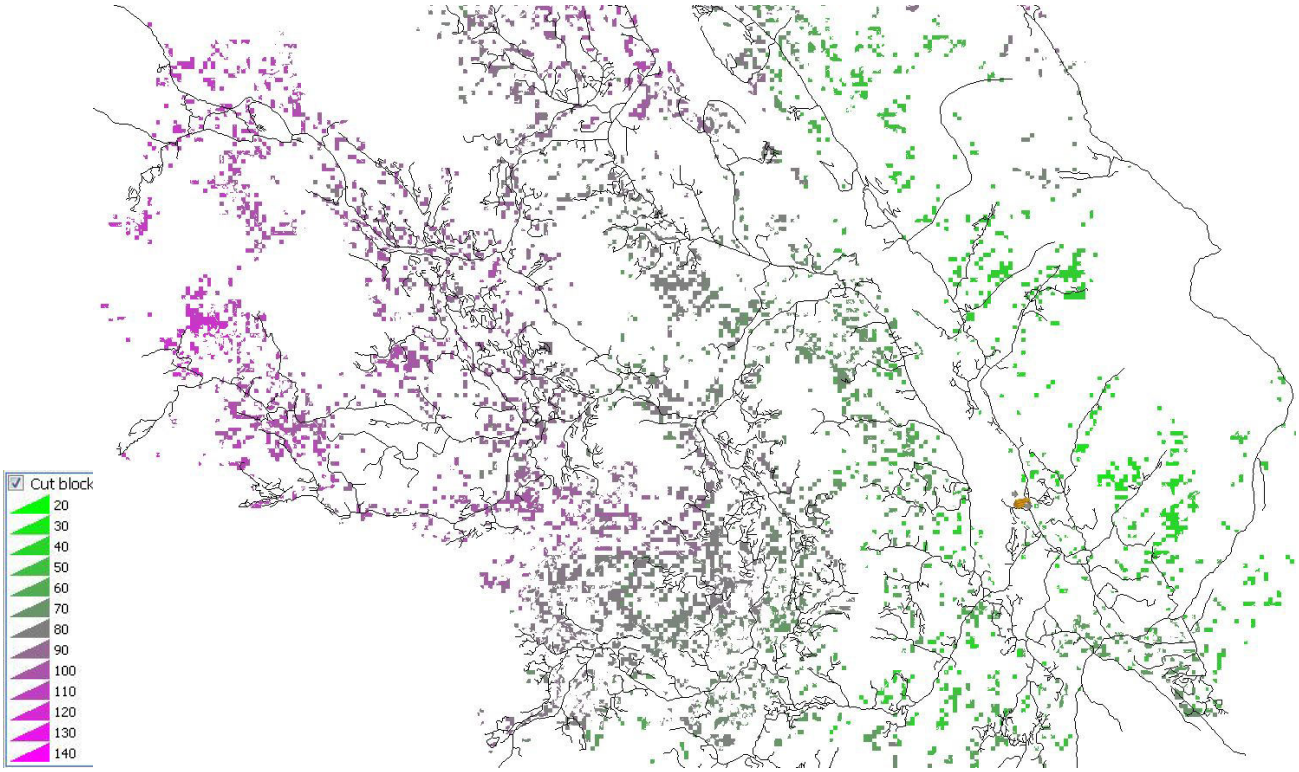


Figure 13. Cost of delivered biomass from point of origin to the town of Mackenzie, in increments of $10/ODT: southern detail. Blocks with the lowest delivered costs are the greenest in colour. The most expensive blocks are violet in colour. The brown log pile represents a log dump on the lake. The colour scale represents estimated cost ($/ODT) of delivered biomass from that block.

Conifex harvest projection: Comparison to MFLNRO projection

We used data provided by Conifex Timber Inc., one of several licensees in the area, to perform some separate analyses of specific Conifex areas and these runs were compared to ones based on the MFLNRO data for the Mackenzie TSA. The comparison showed that, not surprisingly, less biomass was predicted by the Conifex data. Although the total Conifex harvest is 44% of the MFLNRO's total projection, the Conifex amount available at $60/ODT is only 29% of the MFLNRO amount. This may be because Conifex harvest areas are further from the delivery point (Mackenzie) on average; the Conifex blocks were spread further afield and occurred only in Conifex-designated areas.

The comparison showed that the Conifex harvest projection contained more spruce than lodgepole pine, while the MFLNRO projection contained more pine. This would also tend to reduce the amount of biomass available for Conifex, because less biomass is obtained from mountain pine beetle-killed pine.

A comparison of biomass predictions based on the Conifex and MFNRO datasets is in Table 8.

Table 8. Biomass projections, based on the Conifex and MFLNRO datasets, by cost per ODT and grinding cost: comparison

Cost ($/ODT)	MFLNRO		Conifex	
	Grinding at $20.48/ODT (ODT)	Grinding at $27.27/ODT (ODT)	Grinding at $20.48/ODT (ODT)	Grinding at $27.27/ODT (ODT)
30	83 729	59 073	559.4	522
40	469 035	131 025	71 685	2653.1
50	1 601 517	695 805	334 234	142 265
60	3 604 983	2 359 944	1 046 118	535 119
70	4 516 075	3 934 032	1 572 294	1 271 706
80	5 199 563	4 749 221	2 066 986	1 754 058
90	5 629 228	5 371 766	2 373 375	2 158 632
100	5 890 053	5 739 248	2 512 143	2 437 076
110	5 952 512	5 948 831	2 564 944	2 525 659
Total volume available	5 952 512	5 952 512	2 648 827	2 648 827
Highest cost ($/ODT)	105.70	112.49	134.10	140.89

6. Conclusions

We developed a method for estimating available forest-origin biomass for British Columbia Timber Supply Areas, using FPInterface. The Quesnel TSA was the test case (Friesen & Goodison, 2011). Extrapolating on that experience and subsequent runs for the Williams Lake TSA (Friesen, 2012a), the Prince George TSA (Friesen, 2012b), and the Lakes TSA (Friesen, 2012c), estimates were made for the Mackenzie TSA. The biomass inventory was based on 20-year harvest and road network plans for Crown land (excluding TFL licenses) provided by the British Columbia Ministry of Forests, Lands and Natural Resources. The delivery point for biomass was designated at the town of Mackenzie only. All planned blocks were assumed to be clearcut harvested, processed at roadside, and accessible to comminution operations.

In addition, we used data provided by Conifex Timber Inc., one of several licensees in the TSA, to perform some separate analyses of specific Conifex areas, and these runs were compared to ones based on the MFLNRO data for the Mackenzie TSA.

The analysis of 20-year biomass supply in the Mackenzie TSA predicts a yield of 38.7 ODT/ha of biomass in the form of hog fuel from harvest residue. The biomass ratio of recovered biomass to recovered roundwood is 42%. This is high for typical harvesting operations, i.e., ones that do not include mountain pine beetle-killed wood, but is usual for areas comprised of some wood degraded by mountain pine beetle infestation.

Because the efficiency of grinding operations has improved in recent years, two price points for grinding were tested: one at $20.48/ODT, representing optimistic conditions, and one at $27.27/ODT, representing less efficient conditions. At an economic price of $60/ODT for delivered hog fuel, the $20.48 grinding scenario predicts 3.6 million ODT for 20 years (180 000 ODT/year) and the $27.27 scenario predicts 2.4 million ODT over 20 years and 120 000 ODT/year.

This difference shows the sensitivity to small gains in grinding efficiency. Additionally, a further 25% more volume is available at $70/ODT ($20.48 grinding scenario), so there is room for realization of even greater biomass volume if higher costs can be paid or greater efficiency can be obtained.

In comparing the run based on the Conifex data to the run based on the MFLNRO data (which comprised the entire Mackenzie TSA), the Conifex total harvest is about 44% of the MFLNRO harvest, but only about 29% as large at the economic level of $60/ODT.

Perhaps the most significant take-away messages from this study are that small gains in efficiency can yield large gains in economic biomass volume, and that the in the Mackenzie TSA the option of using water transportation (via Williston Lake) rather than hauling wood by road makes about half the total biomass available at $60/ODT.

7. References

Friesen, C. (2012a). *Using FPInterface to estimate available forest-origin biomass in British Columbia: Williams Lake TSA* (Technical Report). Vancouver, British Columbia: FPInnovations.

Friesen, C. (2012b). *Using FPInterface to estimate available forest-origin biomass in British Columbia: Prince George TSA* (Technical Report). Vancouver, British Columbia: FPInnovations.

Friesen, C. (2012c). *Using FPInterface to estimate available forest-origin biomass in British Columbia: Lakes TSA* (Technical Report). Vancouver, British Columbia: FPInnovations.

Friesen, C., & Goodison, A. (2011). *Using FPInterface to estimate available forest-origin biomass in British Columbia: Quesnel TSA* (Technical Report). Vancouver, British Columbia: FPInnovations.

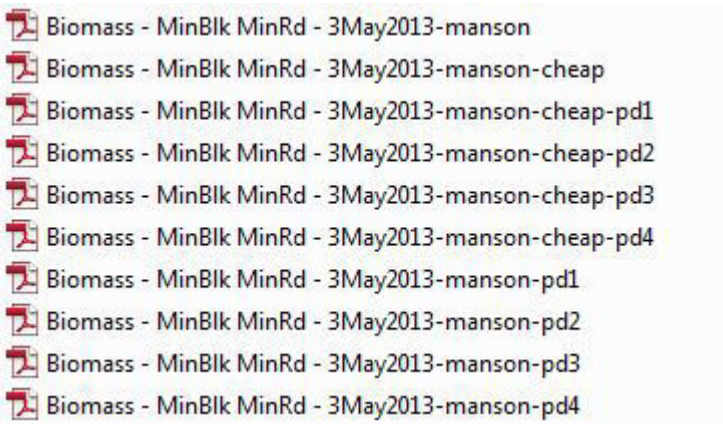
Lambert, M-C., Ung, C-H., & Raulier, R. (2005). Canadian national tree aboveground biomass equations. *Canadian Journal of Forest Research* 35:1996–2008.

Mellgren, P.G. (1980) *Terrain classification for Canadian forestry*. Woodlands Section, Canadian Pulp and Paper Association (CPPA).

Ung, C.-H., Bernier, P., & Guo, X.-J. (2008). Canadian national biomass equations: New parameter estimates that include British Columbia data. *Canadian Journal of Forest Research* 35:1123-1132.

8. Appendix: Output maps and cost-availability tables

1.1 Biomass reports



1.2 Forest Supply Reports

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	153,807.3 ha
Number of cut blocks	890
Recovered biomass	5,952,512.2 odt
Recovery rate	38.7 odt/ha
Biomass odt / Merchantable m³	0.1470 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	31 : 1
Available energy	21,465,675 MWh
Fuel consumption	13.4 L/odt

Cost

Harvesting	21.32 $/odt
Biomass recovery	27.27 $/odt
Transfer yard	5.90 $/odt
Transportation	32.20 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.51 $/odt
Indirect costs	0.00 $/odt
Total	**88.20 $/ odt**

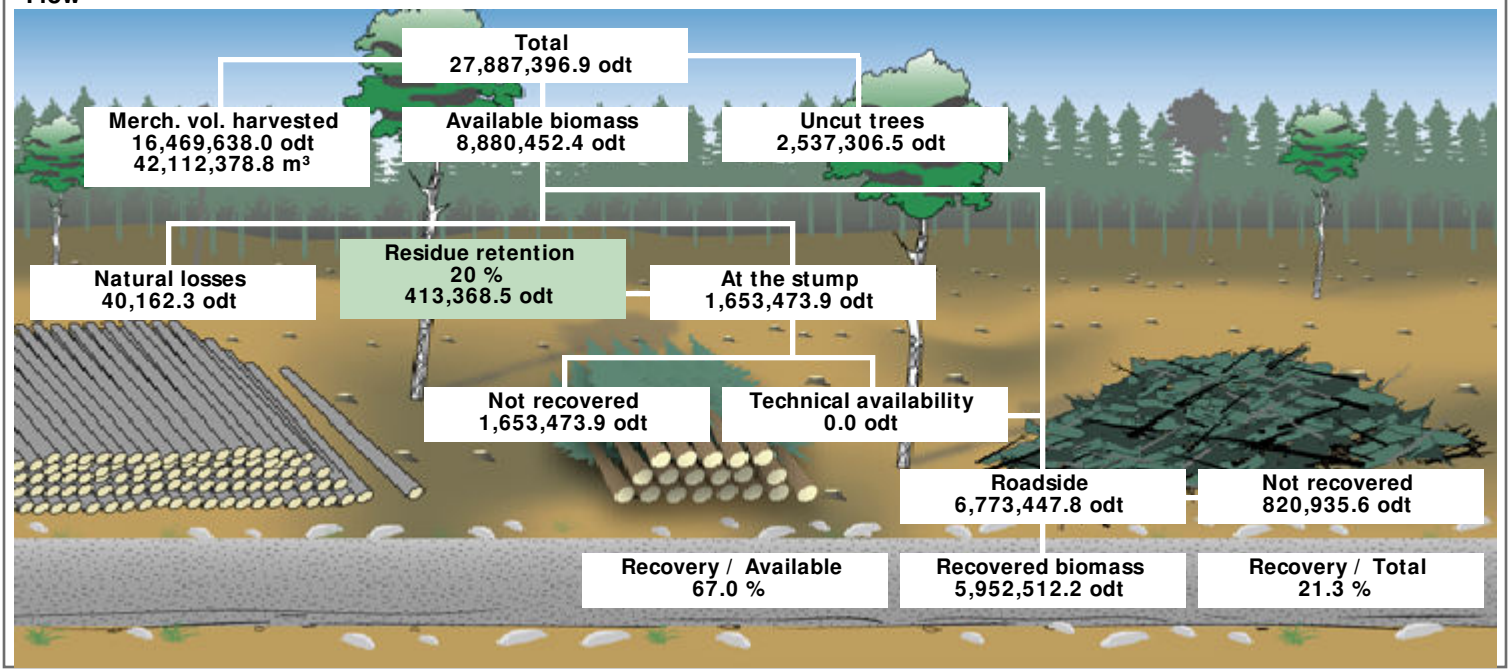
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

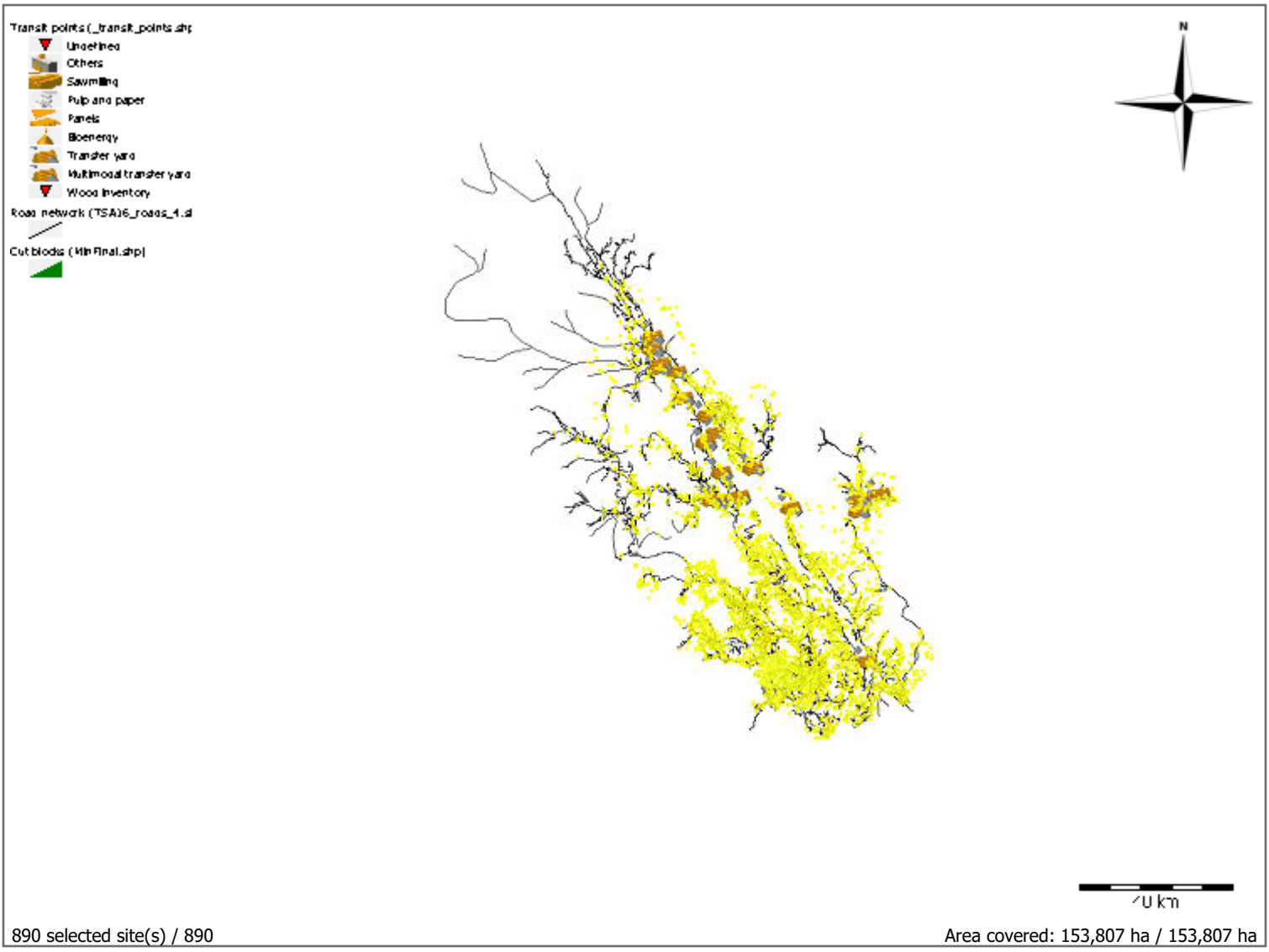
Profit	-88.20 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	1,853,274.9	30.3365	12.05
Pine (residues)	1,628,489.6	0.0870	10.59
Spruce (residues)	1,356,630.1	0.1202	8.82
Subalpine fir (residues)	427,090.0	0.1093	2.78
Pine-biomass (residues)	348,962.1	0.0870	2.27
Aspen (residues)	226,720.8	0.1249	1.47
Birch (residues)	53,920.9	0.1928	0.35
Black spruce (residues)	37,375.4	0.1603	0.24
Cottonwood (residues)	20,000.0	0.1183	0.13
Douglas fir (residues)	48.4	0.1174	0.00
	5,952,512.2	**0.1470**	**38.70**



890 selected site(s) / 890

Area covered: 153,807 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	5,952,512.2	153,807.3	890
• Recovery season			
Summer	0.0	0.0	0
Winter	5,952,512.2	153,807.3	890
• Residue freshness			
Fresh	5,952,512.2	153,807.3	890
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	44,072.3	44,072.3
40 $/odt	0.0	84,543.1	84,543.1
50 $/odt	0.0	496,711.3	496,711.3
60 $/odt	0.0	1,597,187.3	1,597,187.3
70 $/odt	0.0	2,696,849.0	2,696,849.0
80 $/odt	0.0	3,270,622.9	3,270,622.9
90 $/odt	120.2	3,702,443.7	3,702,564.0
100 $/odt	15,000.7	3,960,604.0	3,975,604.6
110 $/odt	46,482.1	4,097,337.4	4,143,819.6
120 $/odt	199,093.9	4,099,237.3	4,298,331.2
130 $/odt	762,756.8	4,099,237.3	4,861,994.1
140 $/odt	1,237,183.3	4,099,237.3	5,336,420.6
150 $/odt	1,471,598.1	4,099,237.3	5,570,835.4
160 $/odt	1,669,322.6	4,099,237.3	5,768,559.9
170 $/odt	1,778,644.1	4,099,237.3	5,877,881.4
180 $/odt	1,851,493.2	4,099,237.3	5,950,730.5
190 $/odt	1,853,274.9	4,099,237.3	5,952,512.2
Maximum cost	**186.62 $/ odt**	**112.49 $/ odt**	

Delivery to mills

Destination	Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>				
	Aspen (residues)	Chips	6,905	0
	Birch (residues)	Chips	1,858	0
	Cottonwood (residues)	Chips	824	0
	Pine (residues)	Chips	14,126	0
	Pine-biomass	Chips	15,258	0
	Pine-biomass (residues)	Chips	3,027	0
	Spruce (residues)	Chips	15,588	0
	Subalpine fir (residues)	Chips	1,746	0
			59,330	**0**
Transfer yard: Raspberry dump				
	Aspen (residues)	Chips	14,712	61
	Birch (residues)	Chips	2,299	33
	Black spruce (residues)	Chips	4,270	63
	Cottonwood (residues)	Chips	552	58
	Pine (residues)	Chips	137,840	58
	Pine-biomass	Chips	145,848	57
	Pine-biomass (residues)	Chips	29,537	58
	Spruce (residues)	Chips	78,815	57
	Subalpine fir (residues)	Chips	13,653	50
			427,526	**57**

Transfer yard: Chunamon dump

Aspen (residues)	Chips	1,260	15
Birch (residues)	Chips	568	22
Black spruce (residues)	Chips	455	14
Cottonwood (residues)	Chips	611	15
Pine (residues)	Chips	7,797	13
Pine-biomass	Chips	10,511	13
Pine-biomass (residues)	Chips	1,671	13
Spruce (residues)	Chips	3,947	13
Subalpine fir (residues)	Chips	975	8
		27,795	**13**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	9,604	14
Birch (residues)	Chips	5,003	14
Black spruce (residues)	Chips	784	16
Cottonwood (residues)	Chips	397	16
Pine (residues)	Chips	65,927	17
Pine-biomass	Chips	77,096	16
Pine-biomass (residues)	Chips	14,127	17
Spruce (residues)	Chips	41,661	17
Subalpine fir (residues)	Chips	10,390	19
		224,989	**17**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	2,660	7
Birch (residues)	Chips	834	9
Black spruce (residues)	Chips	257	6
Cottonwood (residues)	Chips	83	8
Pine (residues)	Chips	14,062	10
Pine-biomass	Chips	16,937	10
Pine-biomass (residues)	Chips	3,013	10
Spruce (residues)	Chips	9,311	10
Subalpine fir (residues)	Chips	2,895	13
		50,053	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	3,170	14
Birch (residues)	Chips	3,238	16
Black spruce (residues)	Chips	120	21
Cottonwood (residues)	Chips	366	16
Pine (residues)	Chips	14,676	17
Pine-biomass	Chips	18,431	17
Pine-biomass (residues)	Chips	3,145	17
Spruce (residues)	Chips	13,895	16
Subalpine fir (residues)	Chips	2,440	16
		59,483	**16**

Transfer yard: Ingenika dump

Aspen (residues)	Chips	307	26
Birch (residues)	Chips	191	26
Black spruce (residues)	Chips	1,163	25
Cottonwood (residues)	Chips	0	46
Pine (residues)	Chips	16,727	25
Pine-biomass	Chips	22,703	25
Pine-biomass (residues)	Chips	3,584	25
Spruce (residues)	Chips	4,983	27
Subalpine fir (residues)	Chips	192	23
		49,851	**25**

Transfer yard: Swannell dump

Aspen (residues)	Chips	1,436	29
Birch (residues)	Chips	60	22
Black spruce (residues)	Chips	364	50
Cottonwood (residues)	Chips	90	24
Pine (residues)	Chips	18,879	45
Pine-biomass	Chips	25,570	43
Pine-biomass (residues)	Chips	4,046	45
Spruce (residues)	Chips	7,730	43
Subalpine fir (residues)	Chips	457	52
		58,633	**44**

Transfer yard: Pete Toy dump

Aspen (residues)	Chips	203	8
Birch (residues)	Chips	563	8
Black spruce (residues)	Chips	178	8
Cottonwood (residues)	Chips	62	8
Pine (residues)	Chips	2,636	8
Pine-biomass	Chips	3,568	8
Pine-biomass (residues)	Chips	565	8
Spruce (residues)	Chips	3,029	12
Subalpine fir (residues)	Chips	1,877	15
		12,681	**10**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	2,306	21
Birch (residues)	Chips	0	7
Black spruce (residues)	Chips	317	51
Cottonwood (residues)	Chips	569	37
Pine (residues)	Chips	29,384	41
Pine-biomass	Chips	39,075	39
Pine-biomass (residues)	Chips	6,297	41
Spruce (residues)	Chips	19,008	36
Subalpine fir (residues)	Chips	2,693	31
		99,648	**38**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	784	3
Birch (residues)	Chips	100	3
Cottonwood (residues)	Chips	21	3
Pine (residues)	Chips	2,508	3
Pine-biomass	Chips	2,512	3
Pine-biomass (residues)	Chips	537	3
Spruce (residues)	Chips	3,329	4
Subalpine fir (residues)	Chips	613	4
		10,405	**3**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	17,523	22
Birch (residues)	Chips	5,055	29
Black spruce (residues)	Chips	174	33
Cottonwood (residues)	Chips	476	23
Pine (residues)	Chips	29,174	25
Pine-biomass	Chips	34,758	25
Pine-biomass (residues)	Chips	6,252	25
Spruce (residues)	Chips	36,922	26
Subalpine fir (residues)	Chips	15,409	29
		145,742	**26**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	1,557	7
Birch (residues)	Chips	270	10
Cottonwood (residues)	Chips	160	2
Pine (residues)	Chips	7,483	7
Pine-biomass	Chips	8,839	8
Pine-biomass (residues)	Chips	1,604	7
Spruce (residues)	Chips	9,913	8
Subalpine fir (residues)	Chips	1,980	8
		31,807	**8**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	1,902	12
Birch (residues)	Chips	201	12
Black spruce (residues)	Chips	295	17
Cottonwood (residues)	Chips	62	12
Pine (residues)	Chips	10,094	14
Pine-biomass	Chips	11,926	14
Pine-biomass (residues)	Chips	2,163	14
Spruce (residues)	Chips	18,205	15
Subalpine fir (residues)	Chips	3,791	15
		48,638	**15**

Transfer yard: Ospika dump

Aspen (residues)	Chips	13,449	17
Birch (residues)	Chips	7,422	18
Black spruce (residues)	Chips	1,268	17
Cottonwood (residues)	Chips	1,816	20
Pine (residues)	Chips	47,517	22
Pine-biomass	Chips	57,378	22
Pine-biomass (residues)	Chips	10,182	22
Spruce (residues)	Chips	36,783	23
Subalpine fir (residues)	Chips	9,243	23
		185,058	**22**

Transfer yard: Isola dump

Aspen (residues)	Chips	902	13
Birch (residues)	Chips	321	12
Black spruce (residues)	Chips	952	11
Cottonwood (residues)	Chips	130	30
Pine (residues)	Chips	9,280	13
Pine-biomass	Chips	12,908	13
Pine-biomass (residues)	Chips	1,989	13
Spruce (residues)	Chips	5,329	15
Subalpine fir (residues)	Chips	301	20
		32,112	**14**

Transfer yard: Deserters dump

Aspen (residues)	Chips	5,099	24
Birch (residues)	Chips	258	19
Black spruce (residues)	Chips	1,747	21
Cottonwood (residues)	Chips	864	19
Pine (residues)	Chips	30,264	20
Pine-biomass	Chips	37,883	20
Pine-biomass (residues)	Chips	6,485	20
Spruce (residues)	Chips	14,881	20
Subalpine fir (residues)	Chips	772	23
		98,252	**20**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	1,671	7
Birch (residues)	Chips	932	7
Black spruce (residues)	Chips	138	8
Cottonwood (residues)	Chips	121	10
Pine (residues)	Chips	15,128	10
Pine-biomass	Chips	21,266	10
Pine-biomass (residues)	Chips	3,242	10
Spruce (residues)	Chips	9,381	10
Subalpine fir (residues)	Chips	908	10
		52,787	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	3,955	25
Birch (residues)	Chips	410	10
Black spruce (residues)	Chips	748	54
Cottonwood (residues)	Chips	235	14
Pine (residues)	Chips	98,736	32
Pine-biomass	Chips	126,964	33
Pine-biomass (residues)	Chips	21,158	32
Spruce (residues)	Chips	43,933	32
Subalpine fir (residues)	Chips	8,324	28
		304,463	**32**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	137,317	64
Birch (residues)	Chips	24,336	51
Black spruce (residues)	Chips	24,145	99
Cottonwood (residues)	Chips	12,561	55
Douglas fir (residues)	Chips	48	29
Pine (residues)	Chips	1,056,251	104
Pine-biomass	Chips	1,163,844	102
Pine-biomass (residues)	Chips	226,339	104
Spruce (residues)	Chips	979,985	95
Subalpine fir (residues)	Chips	348,432	73
		3,973,258	**97**
		5,952,512	**74**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	153,807.3 ha
Number of cut blocks	890
Recovered biomass	5,952,512.2 odt
Recovery rate	38.7 odt/ha
Biomass odt / Merchantable m³	0.1470 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	38 : 1
Available energy	21,465,675 MWh
Fuel consumption	10.8 L/odt

Cost

Harvesting	21.32 $/odt
Biomass recovery	20.48 $/odt
Transfer yard	5.90 $/odt
Transportation	32.20 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.51 $/odt
Indirect costs	0.00 $/odt
Total	**81.41 $/ odt**

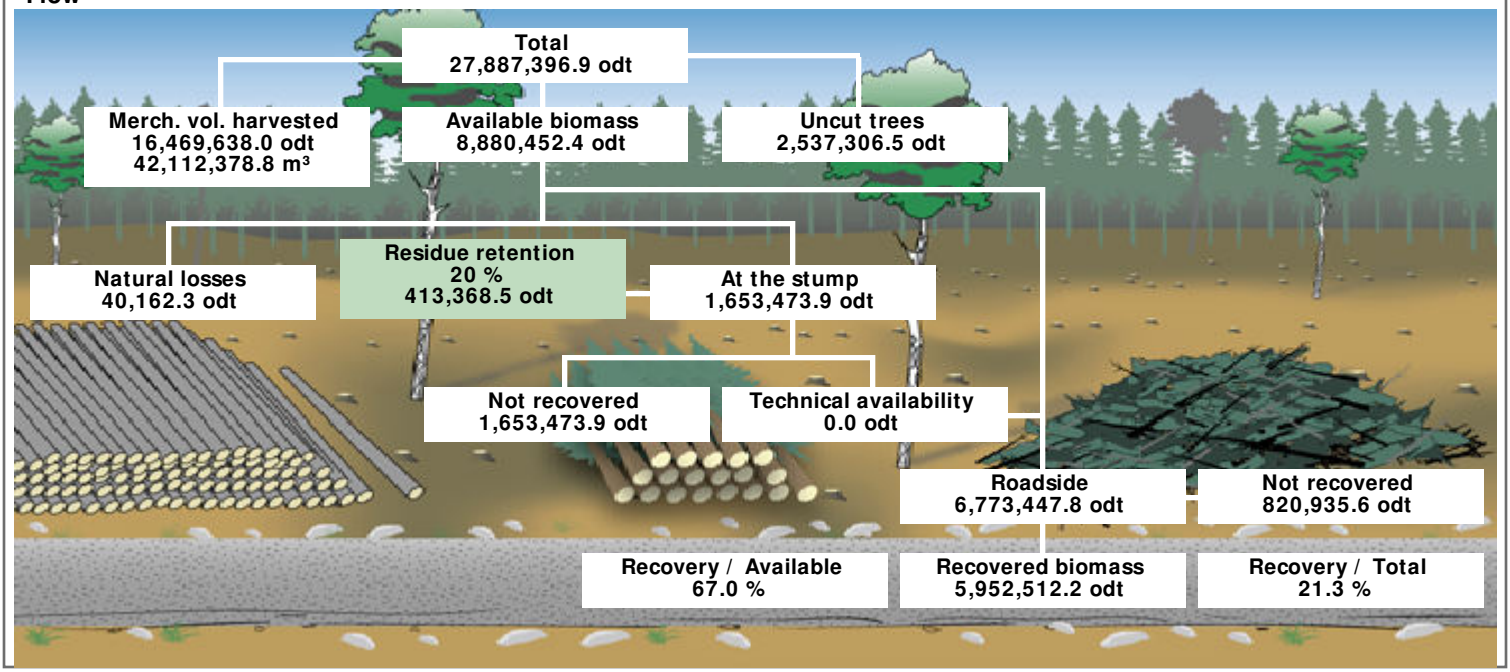
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

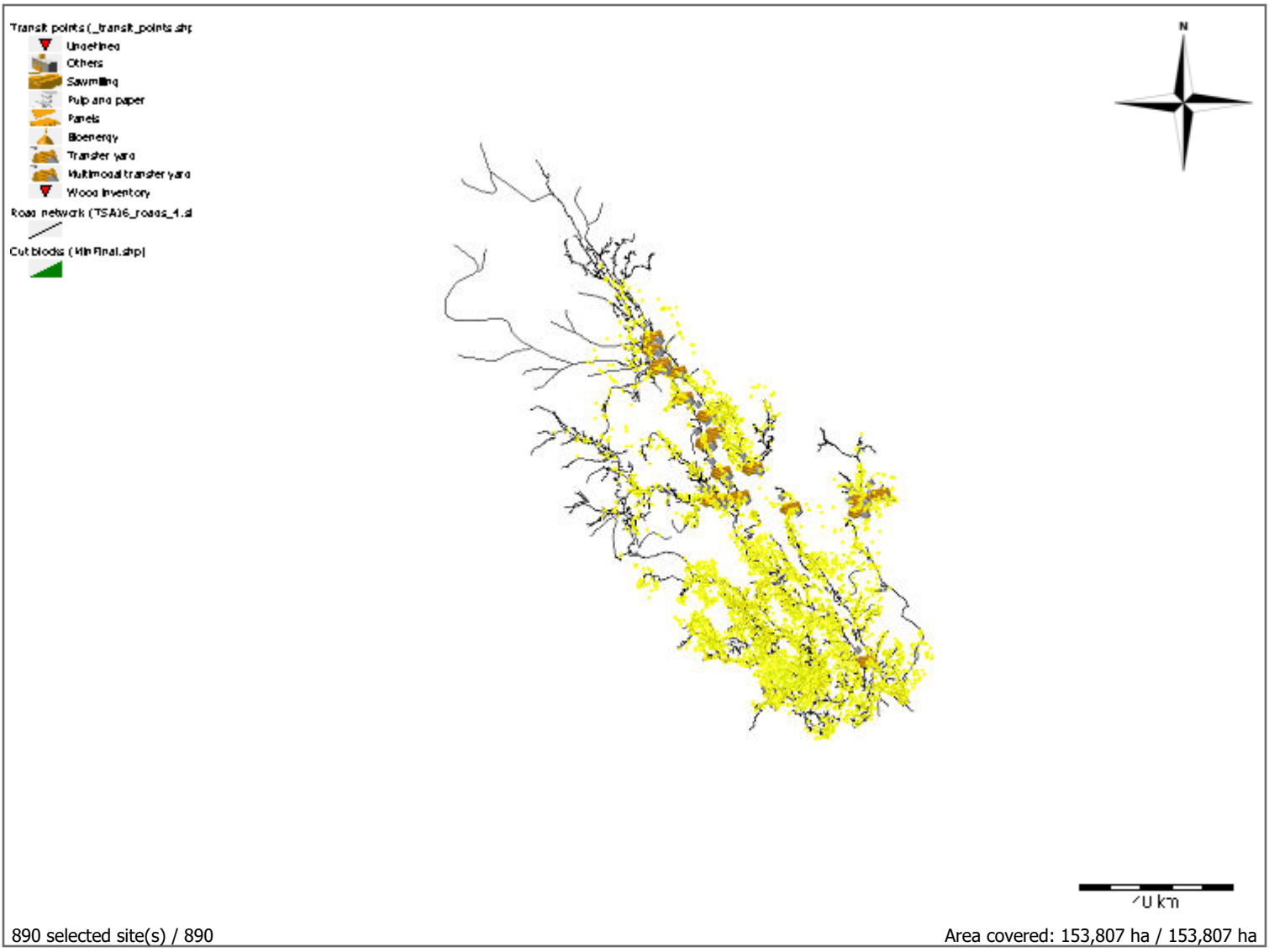
Profit	-81.41 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	1,853,274.9	30.3365	12.05
Pine (residues)	1,628,489.6	0.0870	10.59
Spruce (residues)	1,356,630.1	0.1202	8.82
Subalpine fir (residues)	427,090.0	0.1093	2.78
Pine-biomass (residues)	348,962.1	0.0870	2.27
Aspen (residues)	226,720.8	0.1249	1.47
Birch (residues)	53,920.9	0.1928	0.35
Black spruce (residues)	37,375.4	0.1603	0.24
Cottonwood (residues)	20,000.0	0.1183	0.13
Douglas fir (residues)	48.4	0.1174	0.00
	5,952,512.2	**0.1470**	**38.70**



890 selected site(s) / 890

Area covered: 153,807 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	5,952,512.2	153,807.3	890
• Recovery season			
Summer	0.0	0.0	0
Winter	5,952,512.2	153,807.3	890
• Residue freshness			
Fresh	5,952,512.2	153,807.3	890
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	48,509.0	48,509.0
40 $/odt	0.0	336,643.9	336,643.9
50 $/odt	0.0	1,062,758.5	1,062,758.5
60 $/odt	0.0	2,476,429.3	2,476,429.3
70 $/odt	0.0	3,110,260.1	3,110,260.1
80 $/odt	0.0	3,578,072.3	3,578,072.3
90 $/odt	8,827.8	3,887,207.4	3,896,035.2
100 $/odt	35,220.1	4,068,892.5	4,104,112.6
110 $/odt	132,391.0	4,099,237.3	4,231,628.3
120 $/odt	538,758.6	4,099,237.3	4,637,995.9
130 $/odt	1,128,553.9	4,099,237.3	5,227,791.2
140 $/odt	1,405,815.3	4,099,237.3	5,505,052.6
150 $/odt	1,621,490.6	4,099,237.3	5,720,727.9
160 $/odt	1,742,020.8	4,099,237.3	5,841,258.1
170 $/odt	1,821,160.5	4,099,237.3	5,920,397.8
180 $/odt	1,853,274.9	4,099,237.3	5,952,512.2
Maximum cost	**179.83 $/ odt**	**105.70 $/ odt**	

Delivery to mills

Destination	Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>				
	Aspen (residues)	Chips	6,905	0
	Birch (residues)	Chips	1,858	0
	Cottonwood (residues)	Chips	824	0
	Pine (residues)	Chips	14,126	0
	Pine-biomass	Chips	15,258	0
	Pine-biomass (residues)	Chips	3,027	0
	Spruce (residues)	Chips	15,588	0
	Subalpine fir (residues)	Chips	1,746	0
			59,330	**0**
Transfer yard: Raspberry dump				
	Aspen (residues)	Chips	14,712	61
	Birch (residues)	Chips	2,299	33
	Black spruce (residues)	Chips	4,270	63
	Cottonwood (residues)	Chips	552	58
	Pine (residues)	Chips	137,840	58
	Pine-biomass	Chips	145,848	57
	Pine-biomass (residues)	Chips	29,537	58
	Spruce (residues)	Chips	78,815	57
	Subalpine fir (residues)	Chips	13,653	50
			427,526	**57**

Transfer yard: Chunamon dump

Aspen (residues)	Chips	1,260	15
Birch (residues)	Chips	568	22
Black spruce (residues)	Chips	455	14
Cottonwood (residues)	Chips	611	15
Pine (residues)	Chips	7,797	13
Pine-biomass	Chips	10,511	13
Pine-biomass (residues)	Chips	1,671	13
Spruce (residues)	Chips	3,947	13
Subalpine fir (residues)	Chips	975	8
		27,795	**13**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	9,604	14
Birch (residues)	Chips	5,003	14
Black spruce (residues)	Chips	784	16
Cottonwood (residues)	Chips	397	16
Pine (residues)	Chips	65,927	17
Pine-biomass	Chips	77,096	16
Pine-biomass (residues)	Chips	14,127	17
Spruce (residues)	Chips	41,661	17
Subalpine fir (residues)	Chips	10,390	19
		224,989	**17**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	2,660	7
Birch (residues)	Chips	834	9
Black spruce (residues)	Chips	257	6
Cottonwood (residues)	Chips	83	8
Pine (residues)	Chips	14,062	10
Pine-biomass	Chips	16,937	10
Pine-biomass (residues)	Chips	3,013	10
Spruce (residues)	Chips	9,311	10
Subalpine fir (residues)	Chips	2,895	13
		50,053	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	3,170	14
Birch (residues)	Chips	3,238	16
Black spruce (residues)	Chips	120	21
Cottonwood (residues)	Chips	366	16
Pine (residues)	Chips	14,676	17
Pine-biomass	Chips	18,431	17
Pine-biomass (residues)	Chips	3,145	17
Spruce (residues)	Chips	13,895	16
Subalpine fir (residues)	Chips	2,440	16
		59,483	**16**

Transfer yard: Ingenika dump

Aspen (residues)	Chips	307	26
Birch (residues)	Chips	191	26
Black spruce (residues)	Chips	1,163	25
Cottonwood (residues)	Chips	0	46
Pine (residues)	Chips	16,727	25
Pine-biomass	Chips	22,703	25
Pine-biomass (residues)	Chips	3,584	25
Spruce (residues)	Chips	4,983	27
Subalpine fir (residues)	Chips	192	23
		49,851	**25**

Transfer yard: Swannell dump

Aspen (residues)	Chips	1,436	29
Birch (residues)	Chips	60	22
Black spruce (residues)	Chips	364	50
Cottonwood (residues)	Chips	90	24
Pine (residues)	Chips	18,879	45
Pine-biomass	Chips	25,570	43
Pine-biomass (residues)	Chips	4,046	45
Spruce (residues)	Chips	7,730	43
Subalpine fir (residues)	Chips	457	52
		58,633	**44**

Transfer yard: Pete Toy dump

Aspen (residues)	Chips	203	8
Birch (residues)	Chips	563	8
Black spruce (residues)	Chips	178	8
Cottonwood (residues)	Chips	62	8
Pine (residues)	Chips	2,636	8
Pine-biomass	Chips	3,568	8
Pine-biomass (residues)	Chips	565	8
Spruce (residues)	Chips	3,029	12
Subalpine fir (residues)	Chips	1,877	15
		12,681	**10**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	2,306	21
Birch (residues)	Chips	0	7
Black spruce (residues)	Chips	317	51
Cottonwood (residues)	Chips	569	37
Pine (residues)	Chips	29,384	41
Pine-biomass	Chips	39,075	39
Pine-biomass (residues)	Chips	6,297	41
Spruce (residues)	Chips	19,008	36
Subalpine fir (residues)	Chips	2,693	31
		99,648	**38**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	784	3
Birch (residues)	Chips	100	3
Cottonwood (residues)	Chips	21	3
Pine (residues)	Chips	2,508	3
Pine-biomass	Chips	2,512	3
Pine-biomass (residues)	Chips	537	3
Spruce (residues)	Chips	3,329	4
Subalpine fir (residues)	Chips	613	4
		10,405	**3**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	17,523	22
Birch (residues)	Chips	5,055	29
Black spruce (residues)	Chips	174	33
Cottonwood (residues)	Chips	476	23
Pine (residues)	Chips	29,174	25
Pine-biomass	Chips	34,758	25
Pine-biomass (residues)	Chips	6,252	25
Spruce (residues)	Chips	36,922	26
Subalpine fir (residues)	Chips	15,409	29
		145,742	**26**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	1,557	7
Birch (residues)	Chips	270	10
Cottonwood (residues)	Chips	160	2
Pine (residues)	Chips	7,483	7
Pine-biomass	Chips	8,839	8
Pine-biomass (residues)	Chips	1,604	7
Spruce (residues)	Chips	9,913	8
Subalpine fir (residues)	Chips	1,980	8
		31,807	**8**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	1,902	12
Birch (residues)	Chips	201	12
Black spruce (residues)	Chips	295	17
Cottonwood (residues)	Chips	62	12
Pine (residues)	Chips	10,094	14
Pine-biomass	Chips	11,926	14
Pine-biomass (residues)	Chips	2,163	14
Spruce (residues)	Chips	18,205	15
Subalpine fir (residues)	Chips	3,791	15
		48,638	**15**

Transfer yard: Ospika dump

Aspen (residues)	Chips	13,449	17
Birch (residues)	Chips	7,422	18
Black spruce (residues)	Chips	1,268	17
Cottonwood (residues)	Chips	1,816	20
Pine (residues)	Chips	47,517	22
Pine-biomass	Chips	57,378	22
Pine-biomass (residues)	Chips	10,182	22
Spruce (residues)	Chips	36,783	23
Subalpine fir (residues)	Chips	9,243	23
		185,058	**22**

Transfer yard: Isola dump

Aspen (residues)	Chips	902	13
Birch (residues)	Chips	321	12
Black spruce (residues)	Chips	952	11
Cottonwood (residues)	Chips	130	30
Pine (residues)	Chips	9,280	13
Pine-biomass	Chips	12,908	13
Pine-biomass (residues)	Chips	1,989	13
Spruce (residues)	Chips	5,329	15
Subalpine fir (residues)	Chips	301	20
		32,112	**14**

Transfer yard: Deserters dump

Aspen (residues)	Chips	5,099	24
Birch (residues)	Chips	258	19
Black spruce (residues)	Chips	1,747	21
Cottonwood (residues)	Chips	864	19
Pine (residues)	Chips	30,264	20
Pine-biomass	Chips	37,883	20
Pine-biomass (residues)	Chips	6,485	20
Spruce (residues)	Chips	14,881	20
Subalpine fir (residues)	Chips	772	23
		98,252	**20**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	1,671	7
Birch (residues)	Chips	932	7
Black spruce (residues)	Chips	138	8
Cottonwood (residues)	Chips	121	10
Pine (residues)	Chips	15,128	10
Pine-biomass	Chips	21,266	10
Pine-biomass (residues)	Chips	3,242	10
Spruce (residues)	Chips	9,381	10
Subalpine fir (residues)	Chips	908	10
		52,787	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	3,955	25
Birch (residues)	Chips	410	10
Black spruce (residues)	Chips	748	54
Cottonwood (residues)	Chips	235	14
Pine (residues)	Chips	98,736	32
Pine-biomass	Chips	126,964	33
Pine-biomass (residues)	Chips	21,158	32
Spruce (residues)	Chips	43,933	32
Subalpine fir (residues)	Chips	8,324	28
		304,463	**32**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	137,317	64
Birch (residues)	Chips	24,336	51
Black spruce (residues)	Chips	24,145	99
Cottonwood (residues)	Chips	12,561	55
Douglas fir (residues)	Chips	48	29
Pine (residues)	Chips	1,056,251	104
Pine-biomass	Chips	1,163,844	102
Pine-biomass (residues)	Chips	226,339	104
Spruce (residues)	Chips	979,985	95
Subalpine fir (residues)	Chips	348,432	73
		3,973,258	**97**
		5,952,512	**74**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	36,430.9 ha
Number of cut blocks	163
Recovered biomass	1,550,263.2 odt
Recovery rate	42.6 odt/ha
Biomass odt / Merchantable m³	0.1563 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	34 : 1
Available energy	5,606,369 MWh
Fuel consumption	12.4 L/odt

Cost

Harvesting	24.73 $/odt
Biomass recovery	20.48 $/odt
Transfer yard	2.04 $/odt
Transportation	37.48 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.96 $/odt
Indirect costs	0.00 $/odt
Total	**86.70 $/ odt**

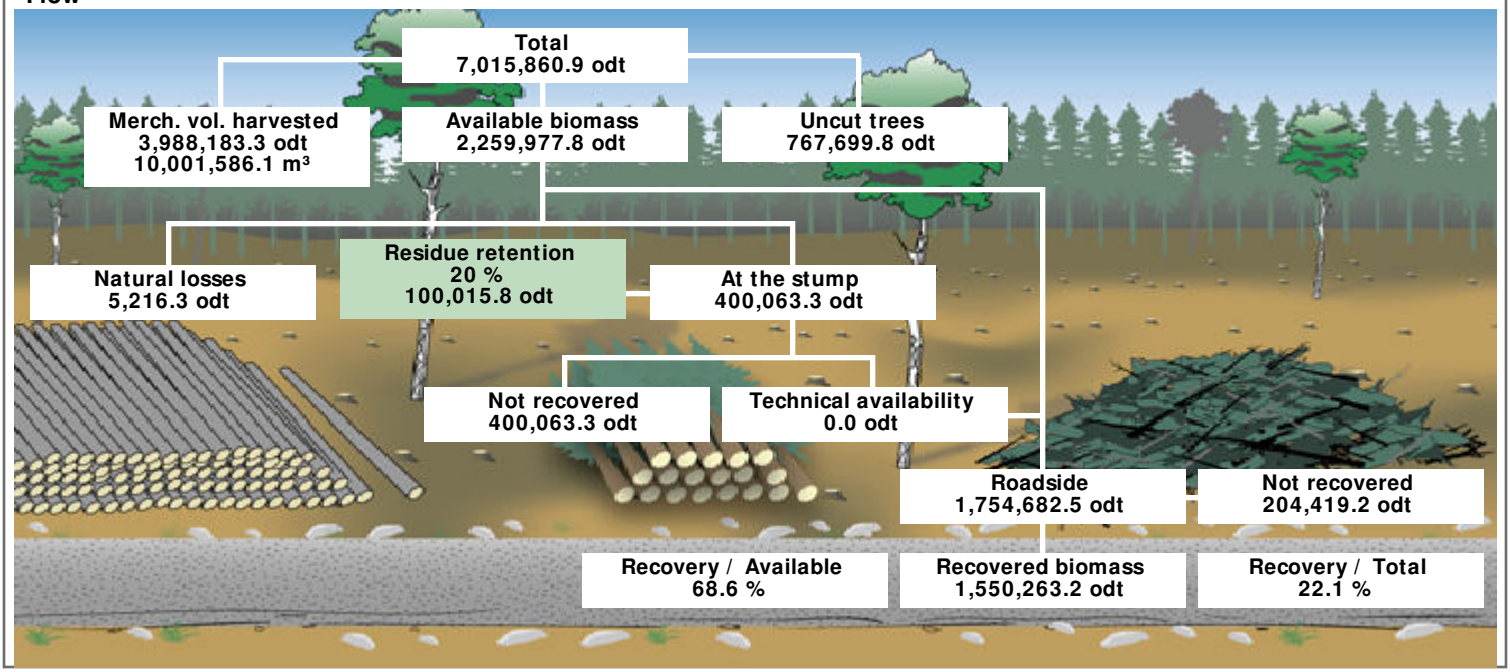
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

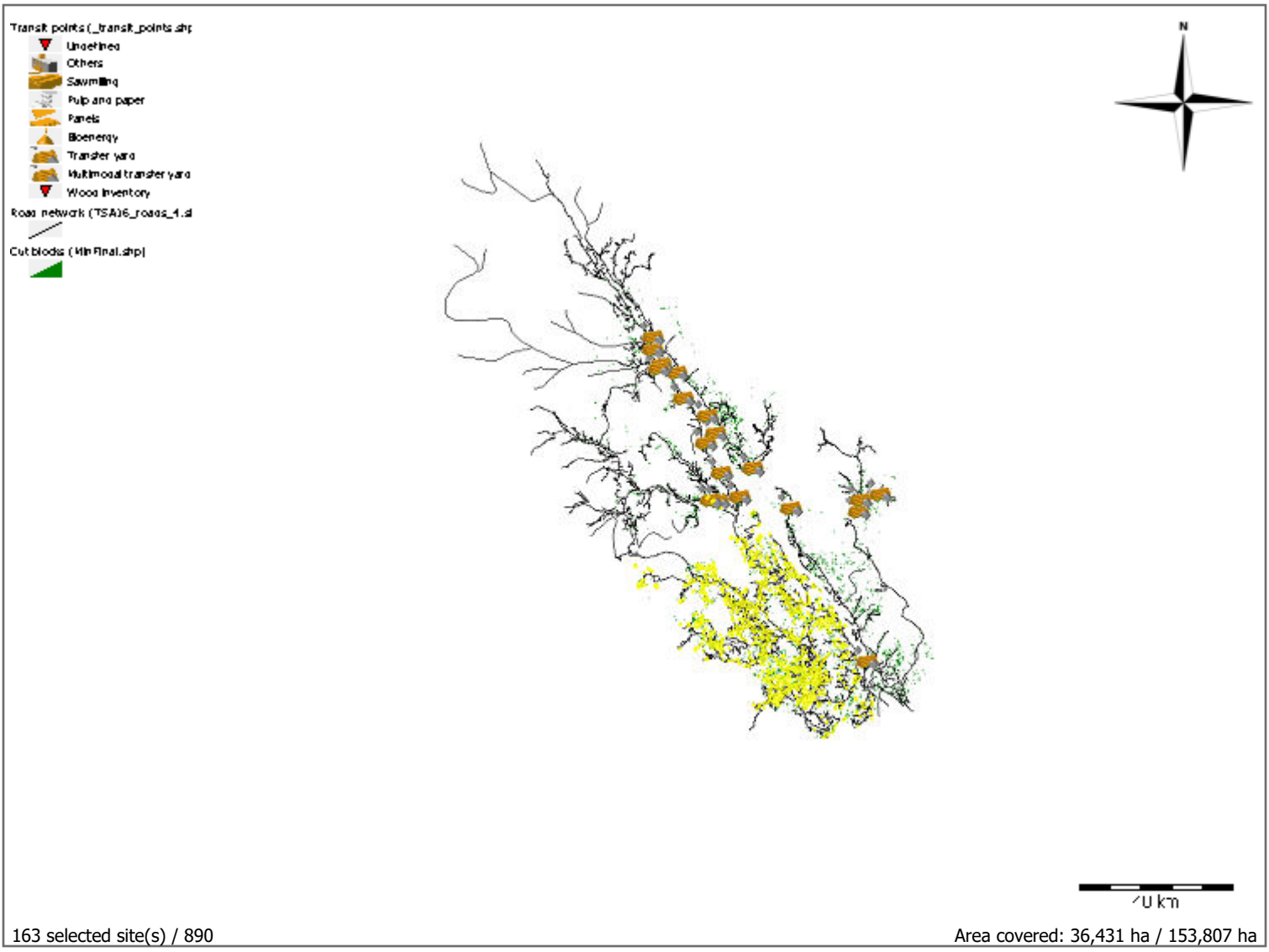
Profit	-86.70 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	558,439.7	37.5532	15.33
Pine (residues)	499,434.9	0.0888	13.71
Spruce (residues)	298,564.9	0.1239	8.20
Pine-biomass (residues)	107,021.8	0.0888	2.94
Subalpine fir (residues)	35,801.3	0.1151	0.98
Aspen (residues)	34,652.2	0.1376	0.95
Black spruce (residues)	10,195.0	0.1653	0.28
Birch (residues)	4,208.7	0.1929	0.12
Cottonwood (residues)	1,944.7	0.1230	0.05
	1,550,263.2	**0.1563**	**42.55**



163 selected site(s) / 890

Area covered: 36,431 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,550,263.2	36,430.9	163
• Recovery season			
Summer	0.0	0.0	0
Winter	1,550,263.2	36,430.9	163
• Residue freshness			
Fresh	1,550,263.2	36,430.9	163
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	0.0	0.0
40 $/odt	0.0	23,086.8	23,086.8
50 $/odt	0.0	157,197.6	157,197.6
60 $/odt	0.0	519,158.4	519,158.4
70 $/odt	0.0	698,790.4	698,790.4
80 $/odt	0.0	896,790.5	896,790.5
90 $/odt	0.0	978,104.5	978,104.5
100 $/odt	2,647.7	983,091.7	985,739.4
110 $/odt	28,491.6	991,823.5	1,020,315.1
120 $/odt	111,792.0	991,823.5	1,103,615.5
130 $/odt	311,264.2	991,823.5	1,303,087.7
140 $/odt	436,335.1	991,823.5	1,428,158.6
150 $/odt	504,102.6	991,823.5	1,495,926.1
160 $/odt	552,161.9	991,823.5	1,543,985.4
170 $/odt	553,654.7	991,823.5	1,545,478.2
180 $/odt	558,439.7	991,823.5	1,550,263.2
Maximum cost	**174.25 $/ odt**	**102.24 $/ odt**	

Delivery to mills

Destination / Product	Format	odt	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen (residues)	Chips	5,008	68
Birch (residues)	Chips	488	59
Black spruce (residues)	Chips	1,614	65
Cottonwood (residues)	Chips	269	65
Pine (residues)	Chips	54,133	64
Pine-biomass	Chips	59,078	64
Pine-biomass (residues)	Chips	11,600	64
Spruce (residues)	Chips	30,446	60
Subalpine fir (residues)	Chips	3,999	53
		166,635	**63**
Transfer yard: Omineca dump			
Aspen (residues)	Chips	182	10
Pine (residues)	Chips	4,468	7
Pine-biomass	Chips	6,418	5
Pine-biomass (residues)	Chips	957	7
Spruce (residues)	Chips	2,744	6
Subalpine fir (residues)	Chips	307	12
		15,076	**6**
Transfer yard: Mackenzie mill			
Aspen (residues)	Chips	29,463	77
Birch (residues)	Chips	3,720	68
Black spruce (residues)	Chips	8,581	93
Cottonwood (residues)	Chips	1,675	79
Pine (residues)	Chips	440,833	98
Pine-biomass	Chips	492,943	97
Pine-biomass (residues)	Chips	94,464	98
Spruce (residues)	Chips	265,375	102
Subalpine fir (residues)	Chips	31,496	103
		1,368,553	**98**

	1,550,263	93

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	41,937.8 ha
Number of cut blocks	175
Recovered biomass	1,681,152.3 odt
Recovery rate	40.1 odt/ha
Biomass odt / Merchantable m³	0.1631 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	33 : 1
Available energy	6,075,719 MWh
Fuel consumption	12.7 L/odt

Cost

Harvesting	23.59 $/odt
Biomass recovery	20.48 $/odt
Transfer yard	2.37 $/odt
Transportation	38.94 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.98 $/odt
Indirect costs	0.00 $/odt
Total	**87.36 $/ odt**

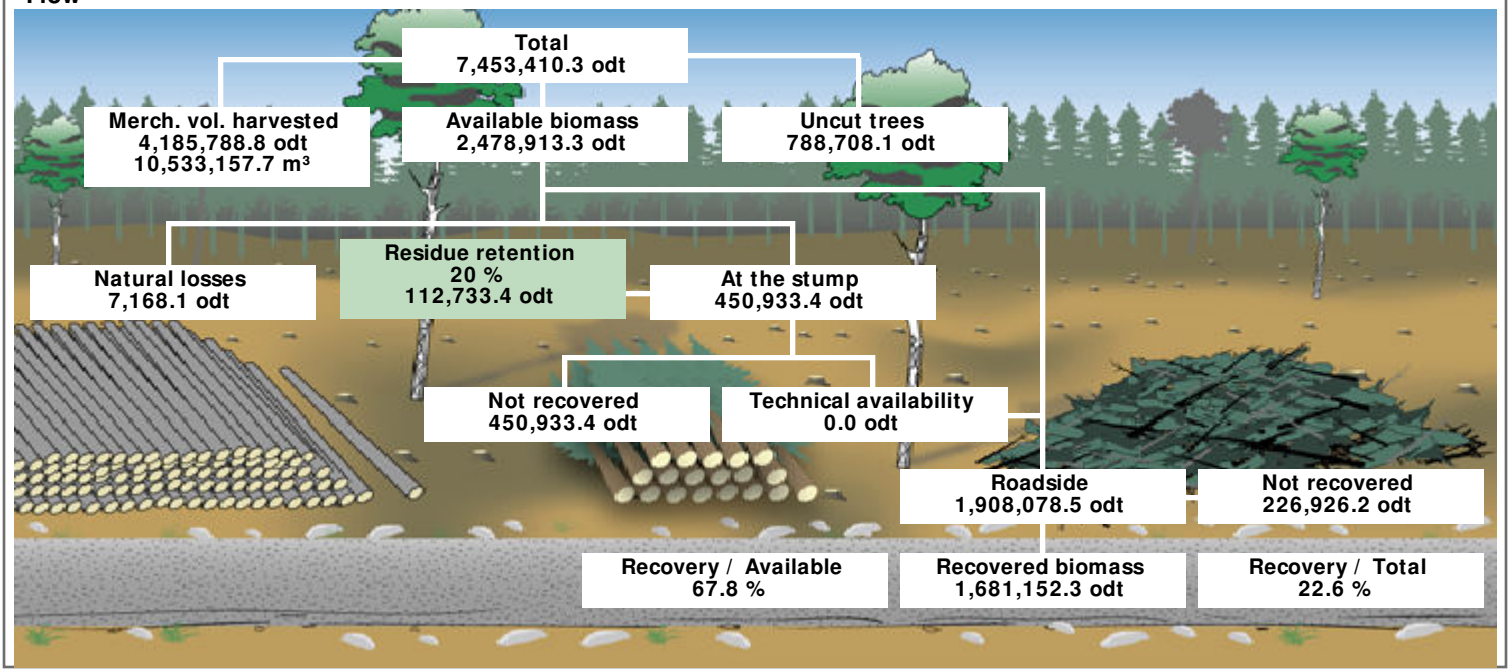
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

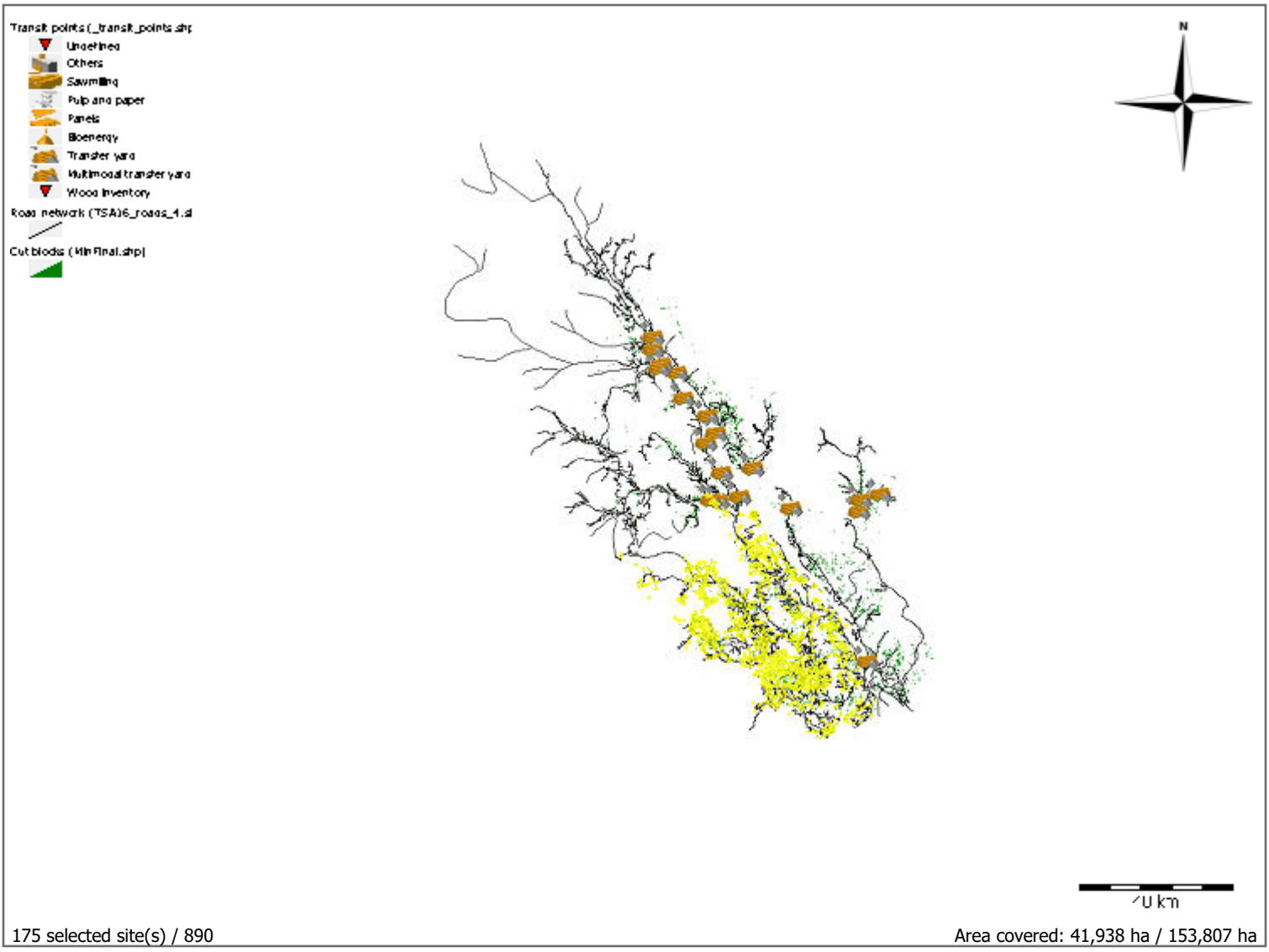
Profit	-87.36 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	563,213.2	40.8512	13.43
Pine (residues)	543,816.1	0.0971	12.97
Spruce (residues)	336,527.0	0.1291	8.02
Pine-biomass (residues)	116,532.0	0.0971	2.78
Subalpine fir (residues)	50,794.7	0.1211	1.21
Aspen (residues)	49,948.1	0.1414	1.19
Black spruce (residues)	13,331.7	0.1731	0.32
Birch (residues)	4,797.2	0.2168	0.11
Cottonwood (residues)	2,192.4	0.1333	0.05
	1,681,152.3	**0.1631**	**40.09**



175 selected site(s) / 890

Area covered: 41,938 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,681,152.3	41,937.8	175
• Recovery season			
Summer	0.0	0.0	0
Winter	1,681,152.3	41,937.8	175
• Residue freshness			
Fresh	1,681,152.3	41,937.8	175
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	0.0	0.0
40 $/odt	0.0	33,423.4	33,423.4
50 $/odt	0.0	165,218.0	165,218.0
60 $/odt	0.0	511,704.4	511,704.4
70 $/odt	0.0	754,719.8	754,719.8
80 $/odt	0.0	950,748.2	950,748.2
90 $/odt	0.0	1,092,570.3	1,092,570.3
100 $/odt	4,425.1	1,111,362.1	1,115,787.2
110 $/odt	32,853.6	1,117,939.1	1,150,792.7
120 $/odt	96,284.9	1,117,939.1	1,214,224.0
130 $/odt	249,968.1	1,117,939.1	1,367,907.2
140 $/odt	357,178.7	1,117,939.1	1,475,117.8
150 $/odt	462,821.8	1,117,939.1	1,580,760.9
160 $/odt	539,473.3	1,117,939.1	1,657,412.4
170 $/odt	559,485.8	1,117,939.1	1,677,424.9
180 $/odt	563,213.2	1,117,939.1	1,681,152.3
Maximum cost	**176.66 $/ odt**	**102.28 $/ odt**	

Delivery to mills

Destination / Product	Format	odt	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen (residues)	Chips	5,937	68
Birch (residues)	Chips	421	55
Black spruce (residues)	Chips	1,829	65
Cottonwood (residues)	Chips	210	58
Pine (residues)	Chips	63,800	64
Pine-biomass	Chips	61,359	64
Pine-biomass (residues)	Chips	13,672	64
Spruce (residues)	Chips	30,080	61
Subalpine fir (residues)	Chips	4,552	56
		181,860	**63**
Transfer yard: Omineca dump			
Aspen (residues)	Chips	797	27
Birch (residues)	Chips	323	10
Black spruce (residues)	Chips	43	69
Cottonwood (residues)	Chips	1	72
Pine (residues)	Chips	15,475	12
Pine-biomass	Chips	18,526	12
Pine-biomass (residues)	Chips	3,316	12
Spruce (residues)	Chips	6,567	22
Subalpine fir (residues)	Chips	1,785	8
		46,833	**14**

Transfer yard: Mackenzie mill

	Aspen (residues)	Chips	43,214	78
	Birch (residues)	Chips	4,053	60
	Black spruce (residues)	Chips	11,460	104
	Cottonwood (residues)	Chips	1,981	92
	Pine (residues)	Chips	464,540	105
	Pine-biomass	Chips	483,328	103
	Pine-biomass (residues)	Chips	99,544	105
	Spruce (residues)	Chips	299,880	105
	Subalpine fir (residues)	Chips	44,458	105
			1,452,459	**103**
			1,681,152	**96**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	38,229.2 ha
Number of cut blocks	243
Recovered biomass	1,518,181.0 odt
Recovery rate	39.7 odt/ha
Biomass odt / Merchantable m³	0.1467 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	64 : 1
Available energy	5,491,127 MWh
Fuel consumption	6.5 L/odt

Cost

Harvesting	25.09 $/odt
Biomass recovery	20.48 $/odt
Transfer yard	15.96 $/odt
Transportation	18.22 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	0.33 $/odt
Indirect costs	0.00 $/odt
Total	**80.07 $/ odt**

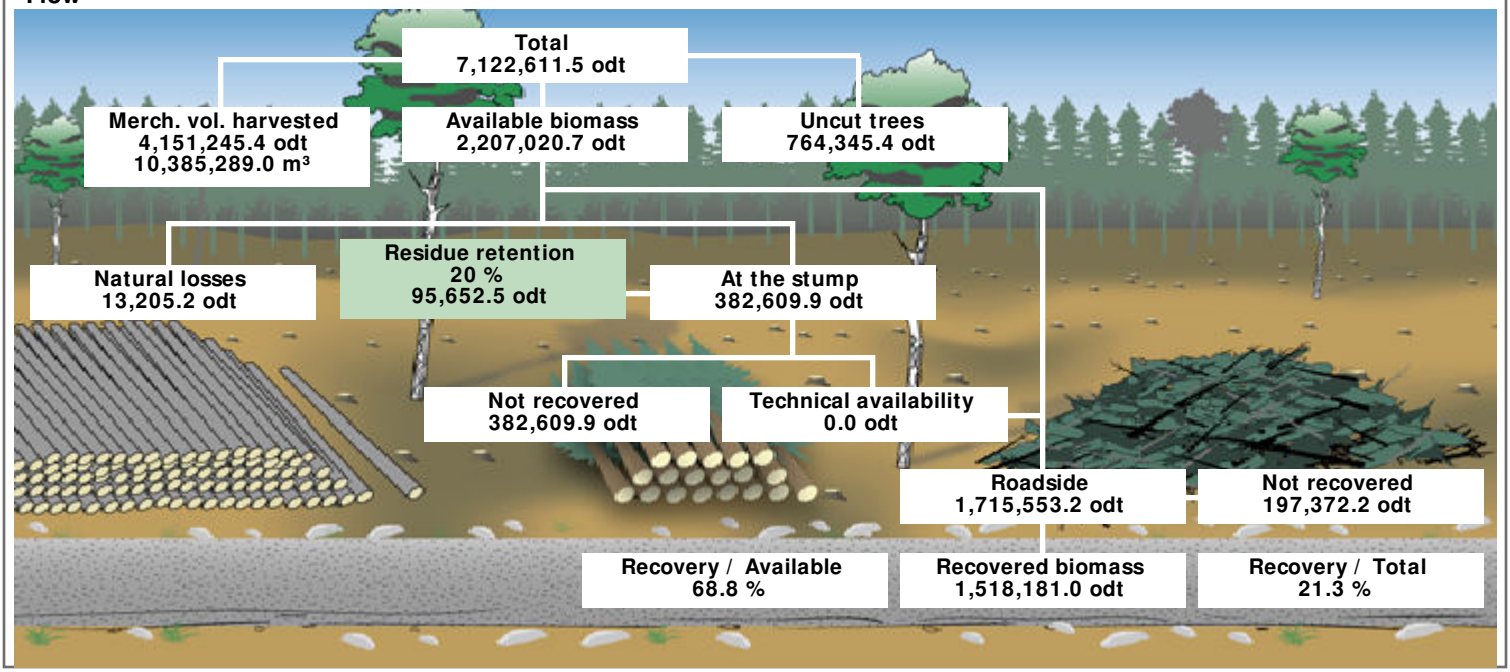
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

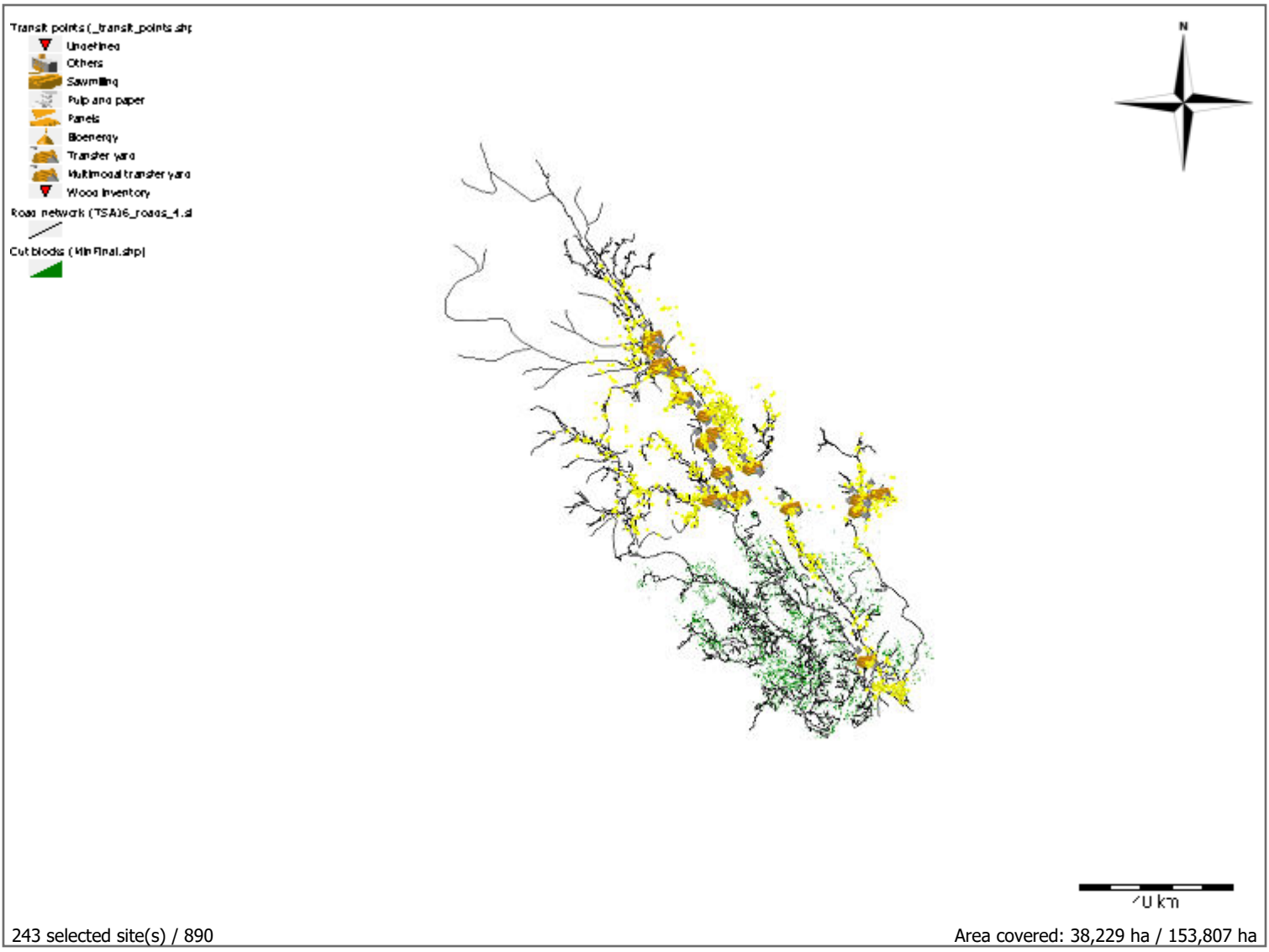
Profit	-80.07 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	569,627.4	25.4655	14.90
Pine (residues)	457,421.3	0.0784	11.97
Spruce (residues)	248,645.7	0.1170	6.50
Pine-biomass (residues)	98,018.8	0.0784	2.56
Aspen (residues)	70,900.3	0.1250	1.85
Subalpine fir (residues)	36,634.5	0.1129	0.96
Birch (residues)	21,795.8	0.1954	0.57
Black spruce (residues)	9,361.8	0.1493	0.24
Cottonwood (residues)	5,775.3	0.1171	0.15
	1,518,181.0	**0.1467**	**39.71**



243 selected site(s) / 890

Area covered: 38,229 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,518,181.0	38,229.2	243
• Recovery season			
Summer	0.0	0.0	0
Winter	1,518,181.0	38,229.2	243
• Residue freshness			
Fresh	1,518,181.0	38,229.2	243
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	32,298.7	32,298.7
40 $/odt	0.0	82,116.1	82,116.1
50 $/odt	0.0	267,951.7	267,951.7
60 $/odt	0.0	708,770.8	708,770.8
70 $/odt	0.0	853,060.9	853,060.9
80 $/odt	0.0	913,257.6	913,257.6
90 $/odt	6,235.6	938,035.2	944,270.8
100 $/odt	19,201.3	944,870.4	964,071.7
110 $/odt	43,506.3	948,553.6	992,059.9
120 $/odt	270,548.5	948,553.6	1,219,102.1
130 $/odt	461,364.9	948,553.6	1,409,918.5
140 $/odt	514,163.7	948,553.6	1,462,717.2
150 $/odt	548,616.3	948,553.6	1,497,169.9
160 $/odt	565,671.4	948,553.6	1,514,225.0
170 $/odt	568,562.3	948,553.6	1,517,115.8
180 $/odt	569,627.4	948,553.6	1,518,181.0
Maximum cost	**171.30 $/ odt**	**105.70 $/ odt**	

Delivery to mills

Destination	Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>				
	Aspen (residues)	Chips	2,824	0
	Birch (residues)	Chips	592	0
	Cottonwood (residues)	Chips	265	0
	Pine (residues)	Chips	11,887	0
	Pine-biomass	Chips	12,327	0
	Pine-biomass (residues)	Chips	2,547	0
	Spruce (residues)	Chips	8,752	0
	Subalpine fir (residues)	Chips	996	0
			40,189	**0**
Transfer yard: Raspberry dump				
	Aspen (residues)	Chips	1,927	20
	Birch (residues)	Chips	876	8
	Black spruce (residues)	Chips	245	21
	Cottonwood (residues)	Chips	15	12
	Pine (residues)	Chips	14,637	11
	Pine-biomass	Chips	19,154	10
	Pine-biomass (residues)	Chips	3,137	11
	Spruce (residues)	Chips	4,082	9
	Subalpine fir (residues)	Chips	536	10
			44,610	**11**

Transfer yard: Chunamon dump

Aspen (residues)	Chips	1,168	16
Birch (residues)	Chips	568	22
Black spruce (residues)	Chips	455	14
Cottonwood (residues)	Chips	486	18
Pine (residues)	Chips	7,646	13
Pine-biomass	Chips	10,279	13
Pine-biomass (residues)	Chips	1,638	13
Spruce (residues)	Chips	3,500	14
Subalpine fir (residues)	Chips	610	10
		26,351	**13**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	8,916	13
Birch (residues)	Chips	2,923	13
Black spruce (residues)	Chips	740	16
Cottonwood (residues)	Chips	387	16
Pine (residues)	Chips	62,810	17
Pine-biomass	Chips	73,473	16
Pine-biomass (residues)	Chips	13,459	17
Spruce (residues)	Chips	37,328	17
Subalpine fir (residues)	Chips	8,495	19
		208,534	**17**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	2,361	6
Birch (residues)	Chips	780	9
Black spruce (residues)	Chips	234	5
Cottonwood (residues)	Chips	83	8
Pine (residues)	Chips	13,480	10
Pine-biomass	Chips	16,258	9
Pine-biomass (residues)	Chips	2,889	10
Spruce (residues)	Chips	8,456	10
Subalpine fir (residues)	Chips	2,520	14
		47,060	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	1,892	12
Birch (residues)	Chips	1,459	14
Black spruce (residues)	Chips	26	14
Cottonwood (residues)	Chips	153	13
Pine (residues)	Chips	12,677	17
Pine-biomass	Chips	15,365	16
Pine-biomass (residues)	Chips	2,716	17
Spruce (residues)	Chips	9,481	15
Subalpine fir (residues)	Chips	1,686	17
		45,456	**16**

Transfer yard: Ingenika dump

Aspen (residues)	Chips	307	26
Birch (residues)	Chips	191	26
Black spruce (residues)	Chips	1,163	25
Cottonwood (residues)	Chips	0	46
Pine (residues)	Chips	16,727	25
Pine-biomass	Chips	22,703	25
Pine-biomass (residues)	Chips	3,584	25
Spruce (residues)	Chips	4,983	27
Subalpine fir (residues)	Chips	192	23
		49,851	**25**

Transfer yard: Swannell dump

Aspen (residues)	Chips	948	30
Birch (residues)	Chips	60	22
Black spruce (residues)	Chips	364	50
Cottonwood (residues)	Chips	90	24
Pine (residues)	Chips	18,757	45
Pine-biomass	Chips	25,357	43
Pine-biomass (residues)	Chips	4,019	45
Spruce (residues)	Chips	7,685	43
Subalpine fir (residues)	Chips	457	52
		57,737	**44**

Transfer yard: Pete Toy dump

Aspen (residues)	Chips	203	8
Birch (residues)	Chips	563	8
Black spruce (residues)	Chips	178	8
Cottonwood (residues)	Chips	62	8
Pine (residues)	Chips	2,636	8
Pine-biomass	Chips	3,568	8
Pine-biomass (residues)	Chips	565	8
Spruce (residues)	Chips	1,605	8
Subalpine fir (residues)	Chips	126	8
		9,507	**8**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	2,158	20
Birch (residues)	Chips	0	7
Black spruce (residues)	Chips	315	51
Cottonwood (residues)	Chips	226	30
Pine (residues)	Chips	28,258	41
Pine-biomass	Chips	37,543	39
Pine-biomass (residues)	Chips	6,055	41
Spruce (residues)	Chips	13,124	37
Subalpine fir (residues)	Chips	1,654	34
		89,332	**39**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	738	3
Birch (residues)	Chips	99	2
Cottonwood (residues)	Chips	13	3
Pine (residues)	Chips	2,180	3
Pine-biomass	Chips	2,136	3
Pine-biomass (residues)	Chips	467	3
Spruce (residues)	Chips	1,265	3
Subalpine fir (residues)	Chips	134	3
		7,034	**3**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	9,769	26
Birch (residues)	Chips	3,525	32
Black spruce (residues)	Chips	169	33
Cottonwood (residues)	Chips	243	27
Pine (residues)	Chips	25,693	24
Pine-biomass	Chips	30,275	25
Pine-biomass (residues)	Chips	5,506	24
Spruce (residues)	Chips	15,133	26
Subalpine fir (residues)	Chips	1,217	22
		91,529	**25**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	1,214	6
Birch (residues)	Chips	54	9
Cottonwood (residues)	Chips	134	1
Pine (residues)	Chips	7,029	7
Pine-biomass	Chips	8,299	8
Pine-biomass (residues)	Chips	1,506	7
Spruce (residues)	Chips	6,473	8
Subalpine fir (residues)	Chips	734	10
		25,442	**8**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	1,384	12
Birch (residues)	Chips	166	14
Black spruce (residues)	Chips	247	18
Cottonwood (residues)	Chips	25	8
Pine (residues)	Chips	8,451	15
Pine-biomass	Chips	10,090	15
Pine-biomass (residues)	Chips	1,811	15
Spruce (residues)	Chips	9,335	15
Subalpine fir (residues)	Chips	1,551	13
		33,060	**15**

Transfer yard: Ospika dump

Aspen (residues)	Chips	11,496	17
Birch (residues)	Chips	5,434	18
Black spruce (residues)	Chips	1,176	18
Cottonwood (residues)	Chips	1,545	21
Pine (residues)	Chips	45,470	22
Pine-biomass	Chips	54,904	22
Pine-biomass (residues)	Chips	9,744	22
Spruce (residues)	Chips	32,383	24
Subalpine fir (residues)	Chips	6,518	23
		168,670	**22**

Transfer yard: Isola dump

Aspen (residues)	Chips	885	12
Birch (residues)	Chips	321	12
Black spruce (residues)	Chips	952	11
Cottonwood (residues)	Chips	15	13
Pine (residues)	Chips	9,078	13
Pine-biomass	Chips	12,661	13
Pine-biomass (residues)	Chips	1,945	13
Spruce (residues)	Chips	4,653	13
Subalpine fir (residues)	Chips	106	22
		30,617	**13**

Transfer yard: Deserters dump

Aspen (residues)	Chips	4,891	24
Birch (residues)	Chips	258	19
Black spruce (residues)	Chips	1,747	21
Cottonwood (residues)	Chips	566	16
Pine (residues)	Chips	30,020	20
Pine-biomass	Chips	37,491	20
Pine-biomass (residues)	Chips	6,433	20
Spruce (residues)	Chips	14,593	20
Subalpine fir (residues)	Chips	772	23
		96,770	**20**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	1,553	7
Birch (residues)	Chips	537	8
Black spruce (residues)	Chips	138	8
Cottonwood (residues)	Chips	121	10
Pine (residues)	Chips	14,802	10
Pine-biomass	Chips	20,803	10
Pine-biomass (residues)	Chips	3,172	10
Spruce (residues)	Chips	8,739	10
Subalpine fir (residues)	Chips	852	10
		50,718	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	2,791	25
Birch (residues)	Chips	87	7
Black spruce (residues)	Chips	649	55
Cottonwood (residues)	Chips	232	14
Pine (residues)	Chips	76,569	39
Pine-biomass	Chips	99,494	39
Pine-biomass (residues)	Chips	16,408	39
Spruce (residues)	Chips	29,353	36
Subalpine fir (residues)	Chips	4,135	39
		229,718	**38**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	13,476	42
Birch (residues)	Chips	3,301	46
Black spruce (residues)	Chips	562	17
Cottonwood (residues)	Chips	1,113	50
Pine (residues)	Chips	48,615	44
Pine-biomass	Chips	57,446	44
Pine-biomass (residues)	Chips	10,418	44
Spruce (residues)	Chips	27,725	53
Subalpine fir (residues)	Chips	3,341	54
		165,996	**45**
		1,518,181	**26**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	37,209.4 ha
Number of cut blocks	309
Recovered biomass	1,202,915.7 odt
Recovery rate	32.3 odt/ha
Biomass odt / Merchantable m³	0.1214 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	42 : 1
Available energy	4,292,460 MWh
Fuel consumption	9.8 L/odt

Cost

Harvesting	8.98 $/odt
Biomass recovery	20.48 $/odt
Transfer yard	3.10 $/odt
Transportation	28.88 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.28 $/odt
Indirect costs	0.00 $/odt
Total	**62.73 $/ odt**

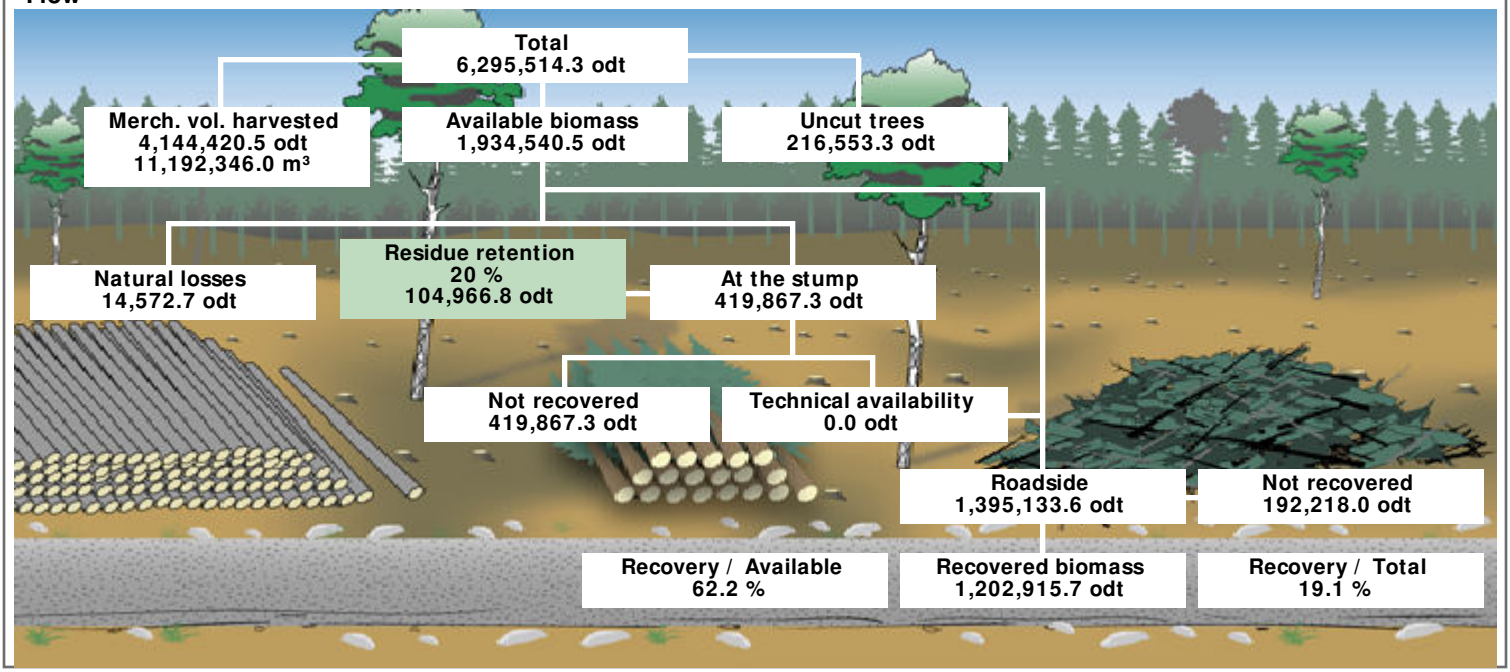
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

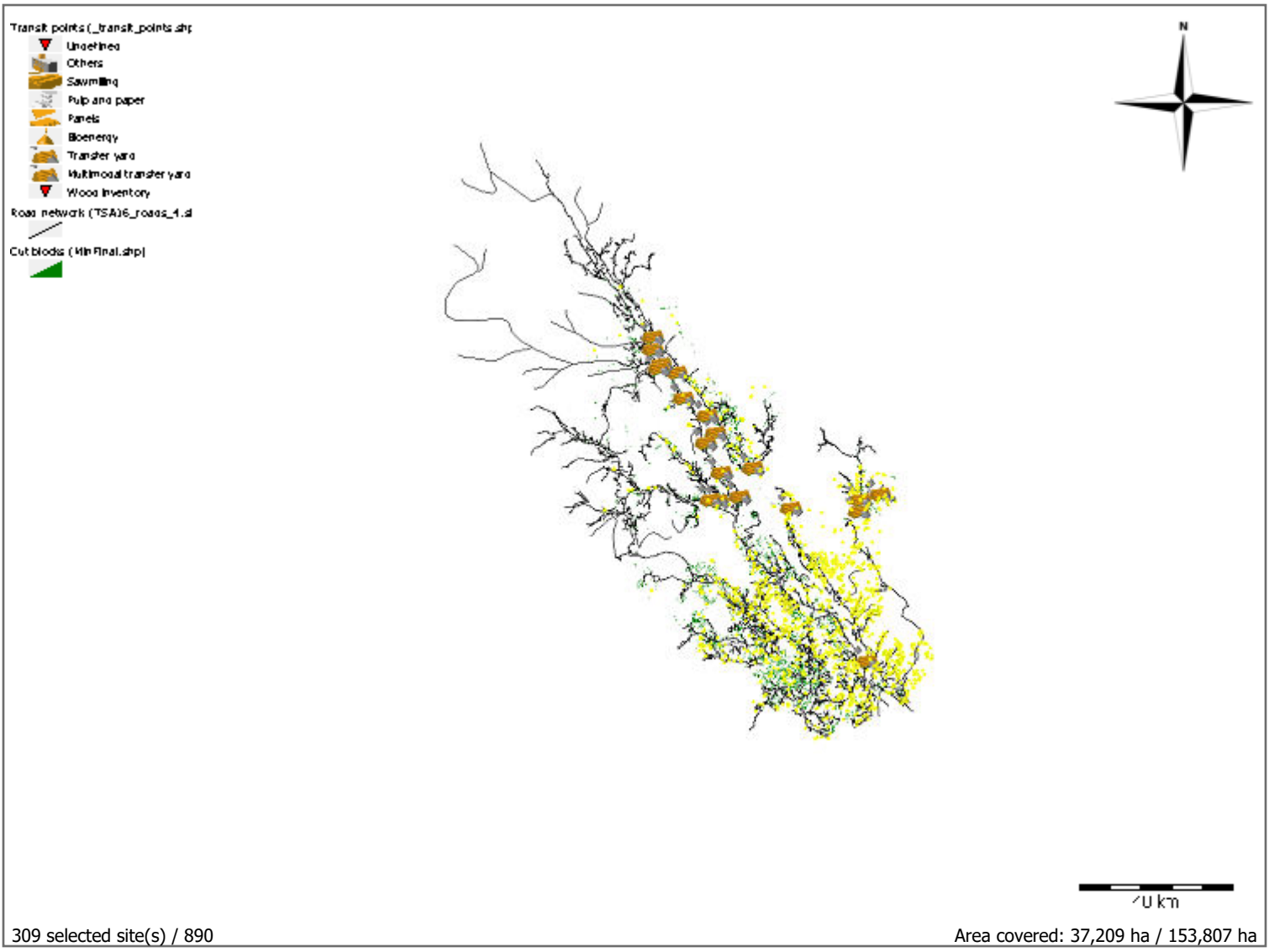
Profit	-62.73 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Spruce (residues)	472,892.4	0.1142	12.71
Subalpine fir (residues)	303,859.6	0.1066	8.17
Pine-biomass	161,994.6	16.0956	4.35
Pine (residues)	127,817.4	0.0768	3.44
Aspen (residues)	71,220.1	0.1108	1.91
Pine-biomass (residues)	27,389.4	0.0768	0.74
Birch (residues)	23,119.2	0.1862	0.62
Cottonwood (residues)	10,087.6	0.1154	0.27
Black spruce (residues)	4,487.0	0.1414	0.12
Douglas fir (residues)	48.4	0.1174	0.00
	1,202,915.7	**0.1214**	**32.33**



309 selected site(s) / 890

Area covered: 37,209 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,202,915.7	37,209.4	309
• Recovery season			
Summer	0.0	0.0	0
Winter	1,202,915.7	37,209.4	309
• Residue freshness			
Fresh	1,202,915.7	37,209.4	309
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	16,210.3	16,210.3
40 $/odt	0.0	198,017.5	198,017.5
50 $/odt	0.0	468,554.1	468,554.1
60 $/odt	0.0	736,795.7	736,795.7
70 $/odt	0.0	895,988.5	895,988.5
80 $/odt	0.0	985,280.8	985,280.8
90 $/odt	2,592.3	1,033,419.9	1,036,012.2
100 $/odt	8,946.0	1,040,921.1	1,049,867.1
110 $/odt	27,539.4	1,040,921.1	1,068,460.5
120 $/odt	60,133.2	1,040,921.1	1,101,054.3
130 $/odt	105,956.7	1,040,921.1	1,146,877.8
140 $/odt	141,164.6	1,040,921.1	1,182,085.7
150 $/odt	154,423.6	1,040,921.1	1,195,344.6
160 $/odt	161,242.8	1,040,921.1	1,202,163.9
170 $/odt	161,994.6	1,040,921.1	1,202,915.7
Maximum cost	**164.56 $/ odt**	**97.54 $/ odt**	

Delivery to mills

Destination	Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>				
	Aspen (residues)	Chips	4,081	0
	Birch (residues)	Chips	1,266	0
	Cottonwood (residues)	Chips	559	0
	Pine (residues)	Chips	2,239	0
	Pine-biomass	Chips	2,930	0
	Pine-biomass (residues)	Chips	480	0
	Spruce (residues)	Chips	6,836	0
	Subalpine fir (residues)	Chips	750	0
			19,141	**0**
Transfer yard: Raspberry dump				
	Aspen (residues)	Chips	1,841	60
	Birch (residues)	Chips	513	34
	Black spruce (residues)	Chips	582	69
	Cottonwood (residues)	Chips	57	41
	Pine (residues)	Chips	5,269	61
	Pine-biomass	Chips	6,256	61
	Pine-biomass (residues)	Chips	1,129	61
	Spruce (residues)	Chips	14,207	56
	Subalpine fir (residues)	Chips	4,566	47
			34,421	**57**
Transfer yard: Chunamon dump				
	Aspen (residues)	Chips	92	5
	Cottonwood (residues)	Chips	125	5
	Pine (residues)	Chips	151	5
	Pine-biomass	Chips	232	5
	Pine-biomass (residues)	Chips	32	5
	Spruce (residues)	Chips	448	5
	Subalpine fir (residues)	Chips	365	5
			1,444	**5**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	688	16
Birch (residues)	Chips	2,079	15
Black spruce (residues)	Chips	43	16
Cottonwood (residues)	Chips	10	22
Pine (residues)	Chips	3,116	18
Pine-biomass	Chips	3,623	17
Pine-biomass (residues)	Chips	668	18
Spruce (residues)	Chips	4,333	14
Subalpine fir (residues)	Chips	1,895	18
		16,455	**16**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	299	16
Birch (residues)	Chips	55	10
Black spruce (residues)	Chips	23	18
Pine (residues)	Chips	582	10
Pine-biomass	Chips	679	10
Pine-biomass (residues)	Chips	125	10
Spruce (residues)	Chips	855	9
Subalpine fir (residues)	Chips	375	7
		2,993	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	1,278	16
Birch (residues)	Chips	1,779	19
Black spruce (residues)	Chips	94	23
Cottonwood (residues)	Chips	213	19
Pine (residues)	Chips	2,000	20
Pine-biomass	Chips	3,067	19
Pine-biomass (residues)	Chips	429	20
Spruce (residues)	Chips	4,414	17
Subalpine fir (residues)	Chips	754	15
		14,027	**18**

Transfer yard: Swannell dump

Aspen (residues)	Chips	488	26
Birch (residues)	Chips	0	26
Pine (residues)	Chips	123	26
Pine-biomass	Chips	214	26
Pine-biomass (residues)	Chips	26	26
Spruce (residues)	Chips	46	26
		897	**26**

Transfer yard: Pete Toy dump

Spruce (residues)	Chips	1,424	16
Subalpine fir (residues)	Chips	1,751	16
		3,175	**16**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	148	37
Black spruce (residues)	Chips	2	31
Cottonwood (residues)	Chips	343	41
Pine (residues)	Chips	1,126	40
Pine-biomass	Chips	1,532	39
Pine-biomass (residues)	Chips	241	40
Spruce (residues)	Chips	5,884	32
Subalpine fir (residues)	Chips	1,039	26
		10,315	**34**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	46	4
Birch (residues)	Chips	1	4
Cottonwood (residues)	Chips	8	4
Pine (residues)	Chips	328	4
Pine-biomass	Chips	375	4
Pine-biomass (residues)	Chips	70	4
Spruce (residues)	Chips	2,064	4
Subalpine fir (residues)	Chips	479	4
		3,372	**4**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	7,754	17
Birch (residues)	Chips	1,530	27
Black spruce (residues)	Chips	4	32
Cottonwood (residues)	Chips	233	17
Pine (residues)	Chips	3,481	25
Pine-biomass	Chips	4,483	25
Pine-biomass (residues)	Chips	746	25
Spruce (residues)	Chips	21,789	26
Subalpine fir (residues)	Chips	14,192	30
		54,213	**25**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	343	10
Birch (residues)	Chips	216	10
Cottonwood (residues)	Chips	26	10
Pine (residues)	Chips	455	10
Pine-biomass	Chips	541	10
Pine-biomass (residues)	Chips	97	10
Spruce (residues)	Chips	3,440	9
Subalpine fir (residues)	Chips	1,247	8
		6,365	**9**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	518	10
Birch (residues)	Chips	34	5
Black spruce (residues)	Chips	48	14
Cottonwood (residues)	Chips	37	14
Pine (residues)	Chips	1,643	12
Pine-biomass	Chips	1,836	12
Pine-biomass (residues)	Chips	352	12
Spruce (residues)	Chips	8,871	16
Subalpine fir (residues)	Chips	2,240	17
		15,578	**15**

Transfer yard: Ospika dump

Aspen (residues)	Chips	1,953	13
Birch (residues)	Chips	1,988	18
Black spruce (residues)	Chips	92	11
Cottonwood (residues)	Chips	270	12
Pine (residues)	Chips	2,047	16
Pine-biomass	Chips	2,474	15
Pine-biomass (residues)	Chips	439	16
Spruce (residues)	Chips	4,400	19
Subalpine fir (residues)	Chips	2,725	23
		16,389	**18**

Transfer yard: Isola dump

Aspen (residues)	Chips	17	20
Cottonwood (residues)	Chips	115	32
Pine (residues)	Chips	202	21
Pine-biomass	Chips	247	20
Pine-biomass (residues)	Chips	43	21
Spruce (residues)	Chips	676	31
Subalpine fir (residues)	Chips	194	19
		1,496	**26**

Transfer yard: Deserters dump

Aspen (residues)	Chips	208	22
Cottonwood (residues)	Chips	298	24
Pine (residues)	Chips	244	16
Pine-biomass	Chips	392	15
Pine-biomass (residues)	Chips	52	16
Spruce (residues)	Chips	288	21
		1,482	**19**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	117	9
Birch (residues)	Chips	395	7
Cottonwood (residues)	Chips	0	7
Pine (residues)	Chips	326	10
Pine-biomass	Chips	463	10
Pine-biomass (residues)	Chips	70	10
Spruce (residues)	Chips	642	11
Subalpine fir (residues)	Chips	55	12
		2,068	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	185	29
Black spruce (residues)	Chips	57	36
Cottonwood (residues)	Chips	2	42
Pine (residues)	Chips	2,224	11
Pine-biomass	Chips	2,526	12
Pine-biomass (residues)	Chips	477	11
Spruce (residues)	Chips	5,270	30
Subalpine fir (residues)	Chips	2,097	26
		12,837	**22**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	51,164	48
Birch (residues)	Chips	13,262	44
Black spruce (residues)	Chips	3,542	83
Cottonwood (residues)	Chips	7,791	39
Douglas fir (residues)	Chips	48	29
Pine (residues)	Chips	102,262	90
Pine-biomass	Chips	130,126	87
Pine-biomass (residues)	Chips	21,913	90
Spruce (residues)	Chips	387,005	72
Subalpine fir (residues)	Chips	269,137	61
		986,250	**72**

	1,202,916	63

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	36,430.9 ha
Number of cut blocks	163
Recovered biomass	1,550,263.2 odt
Recovery rate	42.6 odt/ha
Biomass odt / Merchantable m³	0.1563 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	28 : 1
Available energy	5,606,369 MWh
Fuel consumption	15.0 L/odt

Cost

Harvesting	24.73 $/odt
Biomass recovery	27.27 $/odt
Transfer yard	2.04 $/odt
Transportation	37.48 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.96 $/odt
Indirect costs	0.00 $/odt
Total	**93.49 $/ odt**

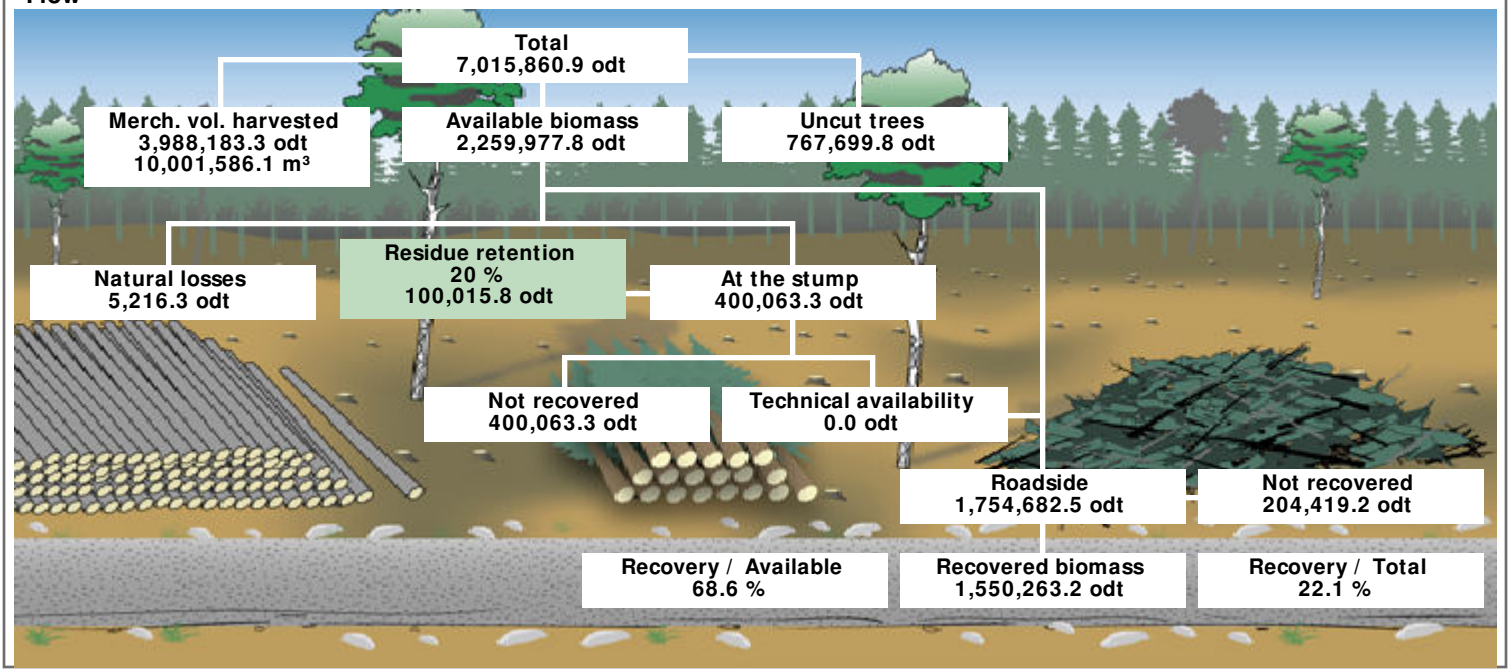
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

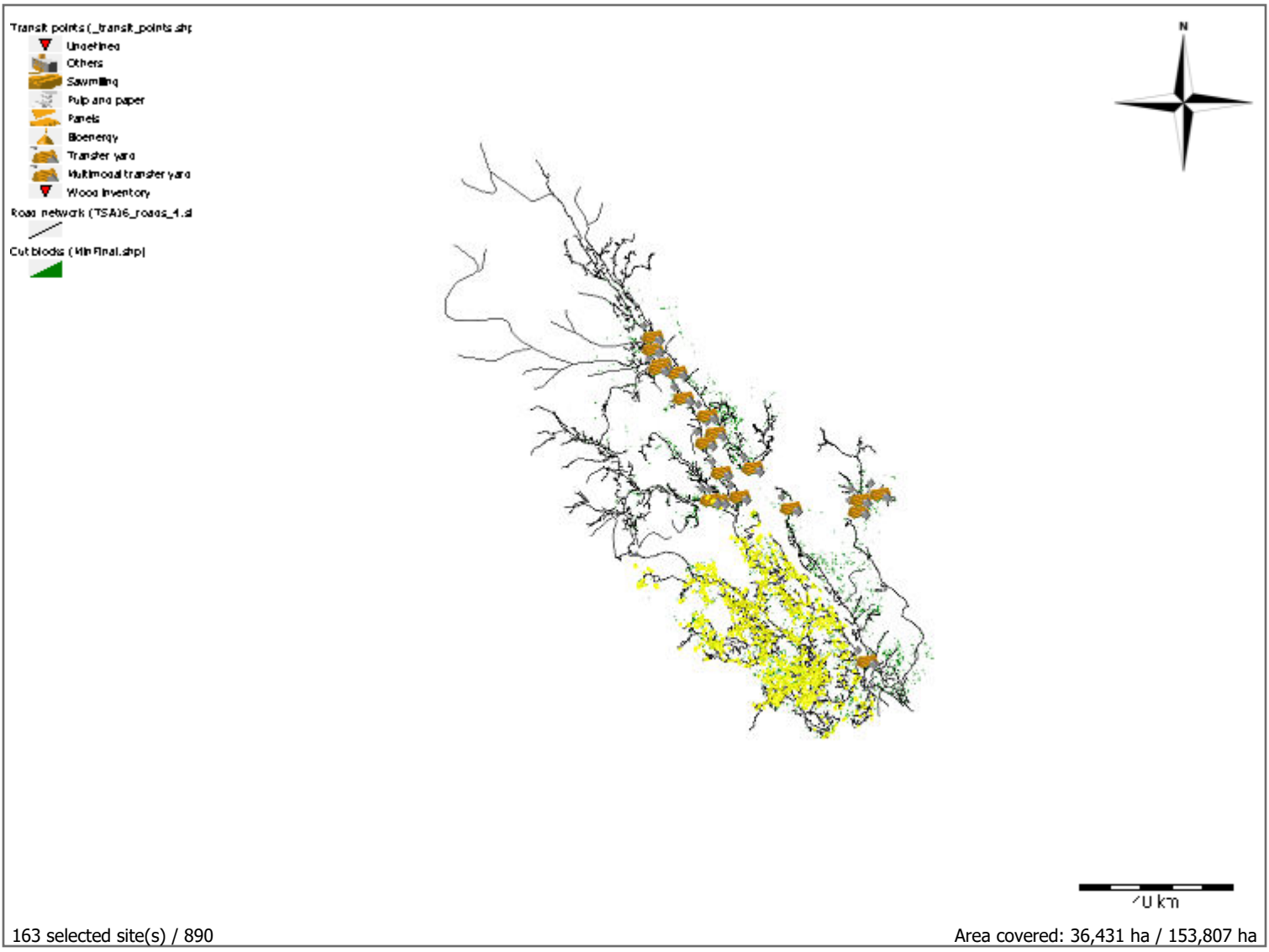
Profit	-93.49 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	558,439.7	37.5532	15.33
Pine (residues)	499,434.9	0.0888	13.71
Spruce (residues)	298,564.9	0.1239	8.20
Pine-biomass (residues)	107,021.8	0.0888	2.94
Subalpine fir (residues)	35,801.3	0.1151	0.98
Aspen (residues)	34,652.2	0.1376	0.95
Black spruce (residues)	10,195.0	0.1653	0.28
Birch (residues)	4,208.7	0.1929	0.12
Cottonwood (residues)	1,944.7	0.1230	0.05
	1,550,263.2	**0.1563**	**42.55**



163 selected site(s) / 890

Area covered: 36,431 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,550,263.2	36,430.9	163
• Recovery season			
Summer	0.0	0.0	0
Winter	1,550,263.2	36,430.9	163
• Residue freshness			
Fresh	1,550,263.2	36,430.9	163
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	0.0	0.0
40 $/odt	0.0	0.0	0.0
50 $/odt	0.0	33,132.4	33,132.4
60 $/odt	0.0	257,889.3	257,889.3
70 $/odt	0.0	554,963.1	554,963.1
80 $/odt	0.0	797,117.3	797,117.3
90 $/odt	0.0	938,305.9	938,305.9
100 $/odt	0.0	979,649.2	979,649.2
110 $/odt	6,011.2	991,823.5	997,834.7
120 $/odt	35,017.7	991,823.5	1,026,841.3
130 $/odt	195,034.6	991,823.5	1,186,858.1
140 $/odt	340,040.7	991,823.5	1,331,864.2
150 $/odt	460,618.1	991,823.5	1,452,441.6
160 $/odt	533,206.4	991,823.5	1,525,029.9
170 $/odt	553,122.2	991,823.5	1,544,945.7
180 $/odt	557,898.4	991,823.5	1,549,721.9
190 $/odt	558,439.7	991,823.5	1,550,263.2
Maximum cost	**181.04 $/ odt**	**109.03 $/ odt**	

Delivery to mills

Destination / Product	Format	odt	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen (residues)	Chips	5,008	68
Birch (residues)	Chips	488	59
Black spruce (residues)	Chips	1,614	65
Cottonwood (residues)	Chips	269	65
Pine (residues)	Chips	54,133	64
Pine-biomass	Chips	59,078	64
Pine-biomass (residues)	Chips	11,600	64
Spruce (residues)	Chips	30,446	60
Subalpine fir (residues)	Chips	3,999	53
		166,635	**63**
Transfer yard: Omineca dump			
Aspen (residues)	Chips	182	10
Pine (residues)	Chips	4,468	7
Pine-biomass	Chips	6,418	5
Pine-biomass (residues)	Chips	957	7
Spruce (residues)	Chips	2,744	6
Subalpine fir (residues)	Chips	307	12
		15,076	**6**
Transfer yard: Mackenzie mill			
Aspen (residues)	Chips	29,463	77
Birch (residues)	Chips	3,720	68
Black spruce (residues)	Chips	8,581	93
Cottonwood (residues)	Chips	1,675	79
Pine (residues)	Chips	440,833	98
Pine-biomass	Chips	492,943	97
Pine-biomass (residues)	Chips	94,464	98
Spruce (residues)	Chips	265,375	102
Subalpine fir (residues)	Chips	31,496	103
		1,368,553	**98**

	1,550,263	93

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	41,937.8 ha
Number of cut blocks	175
Recovered biomass	1,681,152.3 odt
Recovery rate	40.1 odt/ha
Biomass odt / Merchantable m³	0.1631 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	27 : 1
Available energy	6,075,719 MWh
Fuel consumption	15.4 L/odt

Cost

Harvesting	23.59 $/odt
Biomass recovery	27.27 $/odt
Transfer yard	2.37 $/odt
Transportation	38.94 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.98 $/odt
Indirect costs	0.00 $/odt
Total	**94.15 $/ odt**

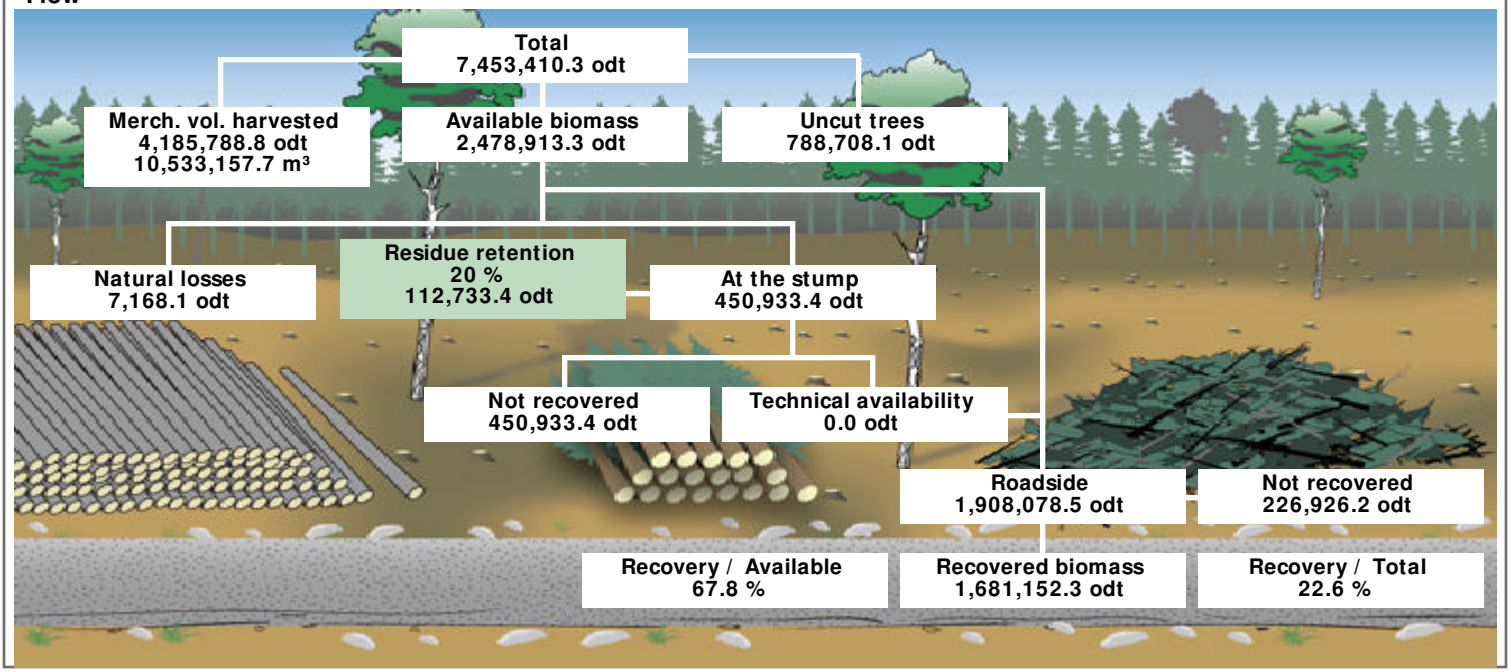
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

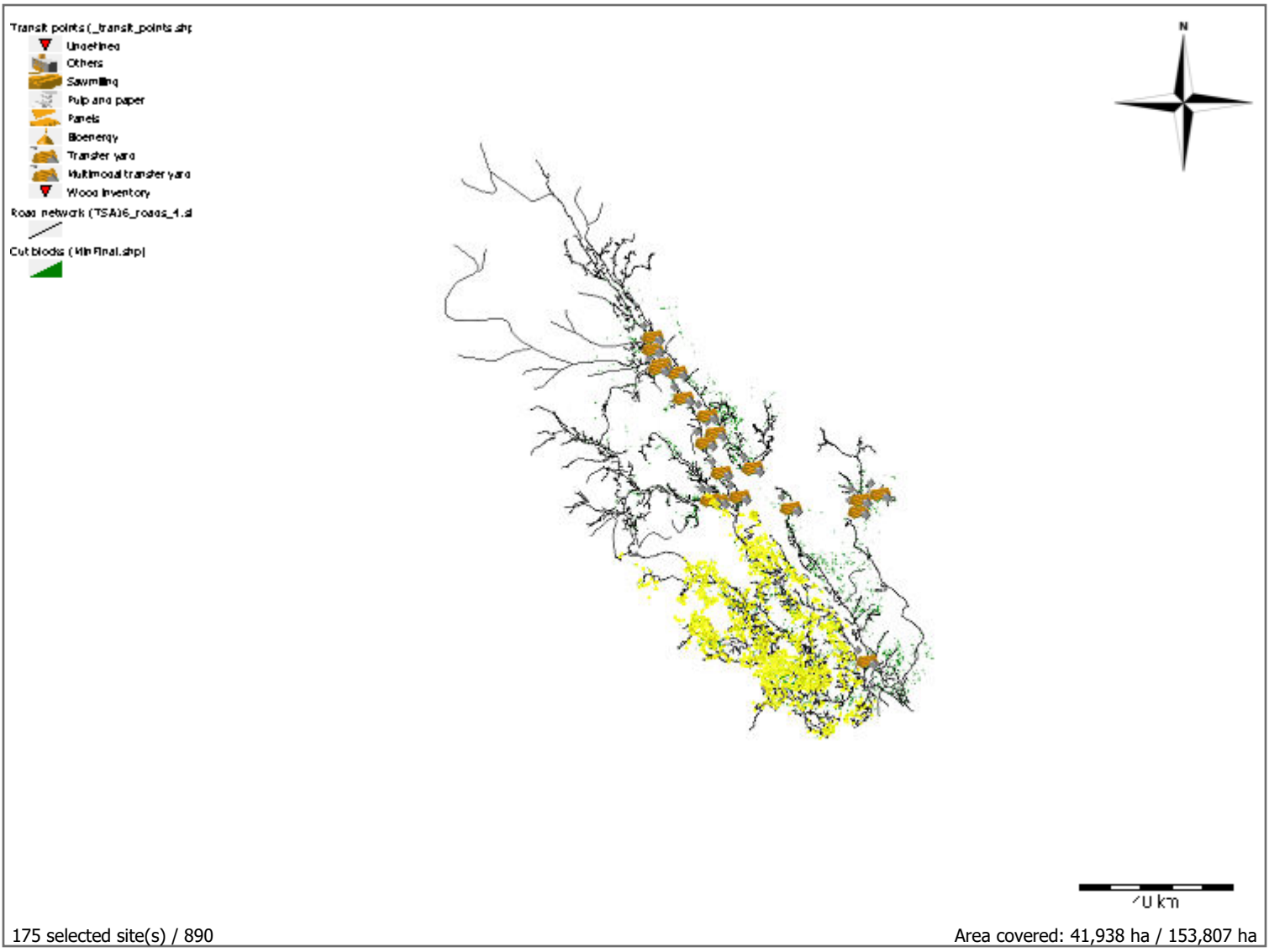
Profit	-94.15 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	563,213.2	40.8512	13.43
Pine (residues)	543,816.1	0.0971	12.97
Spruce (residues)	336,527.0	0.1291	8.02
Pine-biomass (residues)	116,532.0	0.0971	2.78
Subalpine fir (residues)	50,794.7	0.1211	1.21
Aspen (residues)	49,948.1	0.1414	1.19
Black spruce (residues)	13,331.7	0.1731	0.32
Birch (residues)	4,797.2	0.2168	0.11
Cottonwood (residues)	2,192.4	0.1333	0.05
	1,681,152.3	**0.1631**	**40.09**



175 selected site(s) / 890

Area covered: 41,938 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,681,152.3	41,937.8	175
• Recovery season			
Summer	0.0	0.0	0
Winter	1,681,152.3	41,937.8	175
• Residue freshness			
Fresh	1,681,152.3	41,937.8	175
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	0.0	0.0
40 $/odt	0.0	7,202.6	7,202.6
50 $/odt	0.0	66,590.8	66,590.8
60 $/odt	0.0	252,096.0	252,096.0
70 $/odt	0.0	562,786.6	562,786.6
80 $/odt	0.0	837,200.0	837,200.0
90 $/odt	0.0	1,002,723.3	1,002,723.3
100 $/odt	0.0	1,106,209.1	1,106,209.1
110 $/odt	4,425.1	1,117,939.1	1,122,364.2
120 $/odt	41,535.0	1,117,939.1	1,159,474.1
130 $/odt	134,058.5	1,117,939.1	1,251,997.6
140 $/odt	295,211.9	1,117,939.1	1,413,151.0
150 $/odt	398,422.3	1,117,939.1	1,516,361.4
160 $/odt	501,364.6	1,117,939.1	1,619,303.7
170 $/odt	557,542.7	1,117,939.1	1,675,481.8
180 $/odt	562,984.1	1,117,939.1	1,680,923.2
190 $/odt	563,213.2	1,117,939.1	1,681,152.3
Maximum cost	**183.45 $/ odt**	**109.07 $/ odt**	

Delivery to mills

Destination / Product	Format	odt	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen (residues)	Chips	5,937	68
Birch (residues)	Chips	421	55
Black spruce (residues)	Chips	1,829	65
Cottonwood (residues)	Chips	210	58
Pine (residues)	Chips	63,800	64
Pine-biomass	Chips	61,359	64
Pine-biomass (residues)	Chips	13,672	64
Spruce (residues)	Chips	30,080	61
Subalpine fir (residues)	Chips	4,552	56
		181,860	**63**
Transfer yard: Omineca dump			
Aspen (residues)	Chips	797	27
Birch (residues)	Chips	323	10
Black spruce (residues)	Chips	43	69
Cottonwood (residues)	Chips	1	72
Pine (residues)	Chips	15,475	12
Pine-biomass	Chips	18,526	12
Pine-biomass (residues)	Chips	3,316	12
Spruce (residues)	Chips	6,567	22
Subalpine fir (residues)	Chips	1,785	8
		46,833	**14**

Transfer yard: Mackenzie mill

	Aspen (residues)	Chips	43,214	78
	Birch (residues)	Chips	4,053	60
	Black spruce (residues)	Chips	11,460	104
	Cottonwood (residues)	Chips	1,981	92
	Pine (residues)	Chips	464,540	105
	Pine-biomass	Chips	483,328	103
	Pine-biomass (residues)	Chips	99,544	105
	Spruce (residues)	Chips	299,880	105
	Subalpine fir (residues)	Chips	44,458	105
			1,452,459	**103**
			1,681,152	**96**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	38,229.2 ha
Number of cut blocks	243
Recovered biomass	1,518,181.0 odt
Recovery rate	39.7 odt/ha
Biomass odt / Merchantable m³	0.1467 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	45 : 1
Available energy	5,491,127 MWh
Fuel consumption	9.2 L/odt

Cost

Harvesting	25.09 $/odt
Biomass recovery	27.27 $/odt
Transfer yard	15.96 $/odt
Transportation	18.22 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	0.33 $/odt
Indirect costs	0.00 $/odt
Total	**86.86 $/ odt**

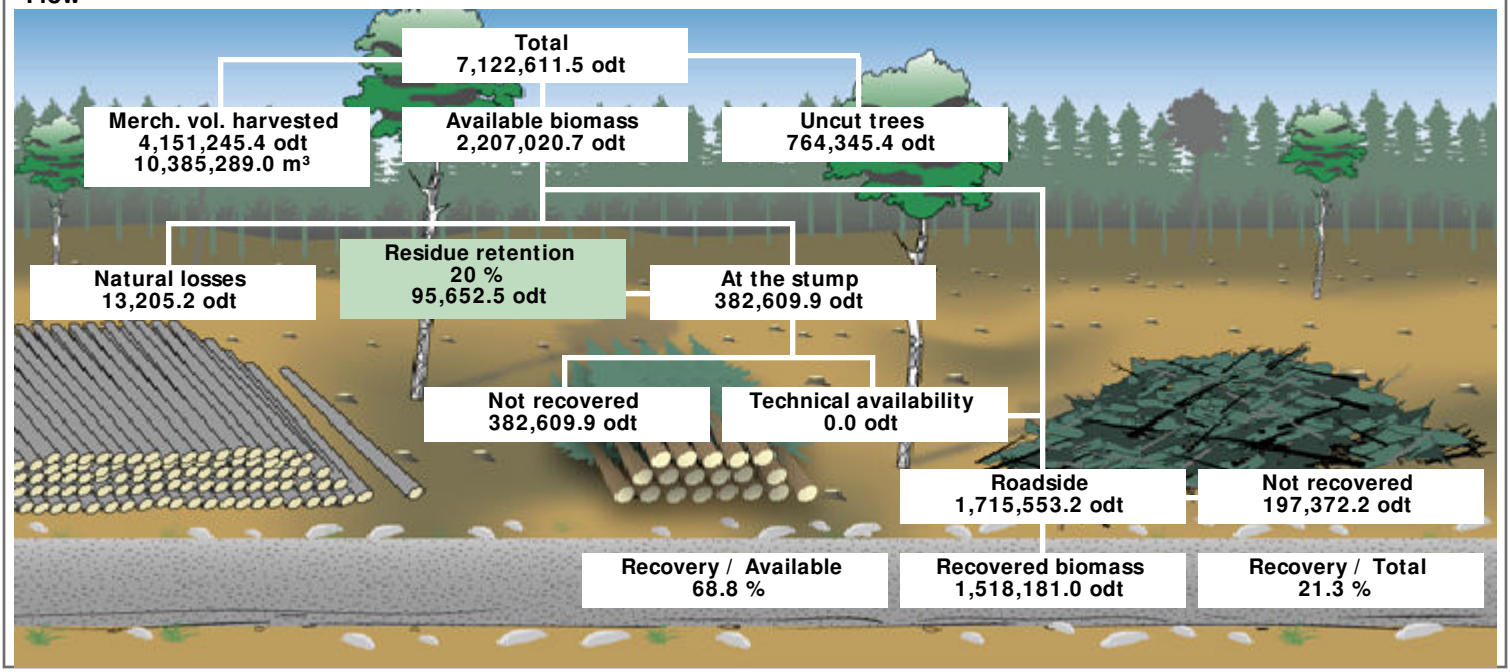
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

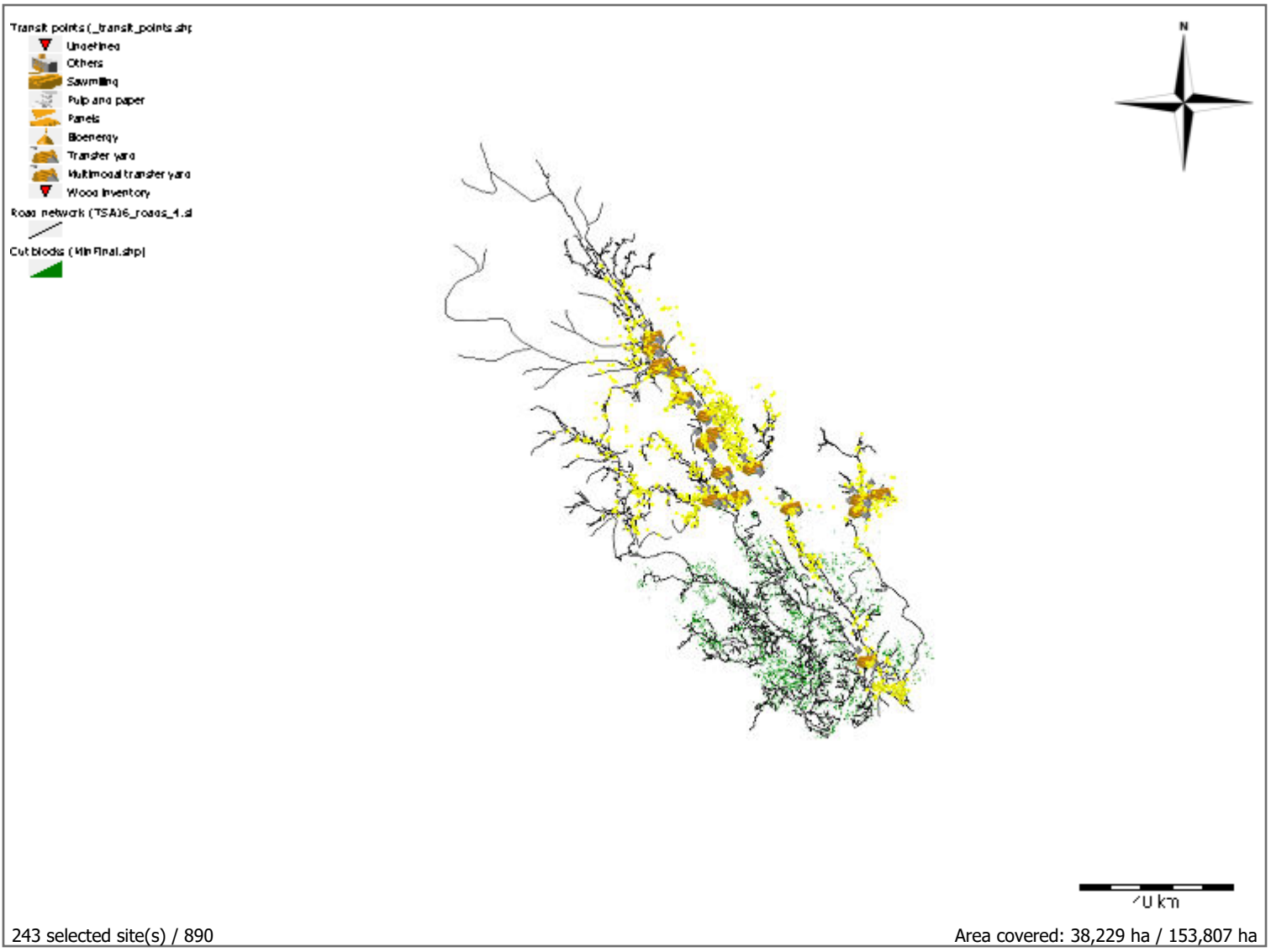
Profit	-86.86 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Pine-biomass	569,627.4	25.4655	14.90
Pine (residues)	457,421.3	0.0784	11.97
Spruce (residues)	248,645.7	0.1170	6.50
Pine-biomass (residues)	98,018.8	0.0784	2.56
Aspen (residues)	70,900.3	0.1250	1.85
Subalpine fir (residues)	36,634.5	0.1129	0.96
Birch (residues)	21,795.8	0.1954	0.57
Black spruce (residues)	9,361.8	0.1493	0.24
Cottonwood (residues)	5,775.3	0.1171	0.15
	1,518,181.0	**0.1467**	**39.71**



243 selected site(s) / 890

Area covered: 38,229 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,518,181.0	38,229.2	243
• Recovery season			
Summer	0.0	0.0	0
Winter	1,518,181.0	38,229.2	243
• Residue freshness			
Fresh	1,518,181.0	38,229.2	243
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	27,861.9	27,861.9
40 $/odt	0.0	35,155.8	35,155.8
50 $/odt	0.0	96,949.9	96,949.9
60 $/odt	0.0	498,928.4	498,928.4
70 $/odt	0.0	782,980.5	782,980.5
80 $/odt	0.0	868,092.9	868,092.9
90 $/odt	0.0	918,227.7	918,227.7
100 $/odt	11,804.4	942,396.9	954,201.3
110 $/odt	23,195.0	947,609.2	970,804.3
120 $/odt	81,813.0	948,553.6	1,030,366.5
130 $/odt	360,483.7	948,553.6	1,309,037.3
140 $/odt	487,891.6	948,553.6	1,436,445.2
150 $/odt	532,562.4	948,553.6	1,481,116.0
160 $/odt	552,512.6	948,553.6	1,501,066.2
170 $/odt	566,788.2	948,553.6	1,515,341.8
180 $/odt	569,627.4	948,553.6	1,518,181.0
Maximum cost	**178.09 $/ odt**	**112.49 $/ odt**	

Delivery to mills

Destination	Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>				
	Aspen (residues)	Chips	2,824	0
	Birch (residues)	Chips	592	0
	Cottonwood (residues)	Chips	265	0
	Pine (residues)	Chips	11,887	0
	Pine-biomass	Chips	12,327	0
	Pine-biomass (residues)	Chips	2,547	0
	Spruce (residues)	Chips	8,752	0
	Subalpine fir (residues)	Chips	996	0
			40,189	**0**
Transfer yard: Raspberry dump				
	Aspen (residues)	Chips	1,927	20
	Birch (residues)	Chips	876	8
	Black spruce (residues)	Chips	245	21
	Cottonwood (residues)	Chips	15	12
	Pine (residues)	Chips	14,637	11
	Pine-biomass	Chips	19,154	10
	Pine-biomass (residues)	Chips	3,137	11
	Spruce (residues)	Chips	4,082	9
	Subalpine fir (residues)	Chips	536	10
			44,610	**11**

Transfer yard: Chunamon dump

Aspen (residues)	Chips	1,168	16
Birch (residues)	Chips	568	22
Black spruce (residues)	Chips	455	14
Cottonwood (residues)	Chips	486	18
Pine (residues)	Chips	7,646	13
Pine-biomass	Chips	10,279	13
Pine-biomass (residues)	Chips	1,638	13
Spruce (residues)	Chips	3,500	14
Subalpine fir (residues)	Chips	610	10
		26,351	**13**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	8,916	13
Birch (residues)	Chips	2,923	13
Black spruce (residues)	Chips	740	16
Cottonwood (residues)	Chips	387	16
Pine (residues)	Chips	62,810	17
Pine-biomass	Chips	73,473	16
Pine-biomass (residues)	Chips	13,459	17
Spruce (residues)	Chips	37,328	17
Subalpine fir (residues)	Chips	8,495	19
		208,534	**17**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	2,361	6
Birch (residues)	Chips	780	9
Black spruce (residues)	Chips	234	5
Cottonwood (residues)	Chips	83	8
Pine (residues)	Chips	13,480	10
Pine-biomass	Chips	16,258	9
Pine-biomass (residues)	Chips	2,889	10
Spruce (residues)	Chips	8,456	10
Subalpine fir (residues)	Chips	2,520	14
		47,060	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	1,892	12
Birch (residues)	Chips	1,459	14
Black spruce (residues)	Chips	26	14
Cottonwood (residues)	Chips	153	13
Pine (residues)	Chips	12,677	17
Pine-biomass	Chips	15,365	16
Pine-biomass (residues)	Chips	2,716	17
Spruce (residues)	Chips	9,481	15
Subalpine fir (residues)	Chips	1,686	17
		45,456	**16**

Transfer yard: Ingenika dump

Aspen (residues)	Chips	307	26
Birch (residues)	Chips	191	26
Black spruce (residues)	Chips	1,163	25
Cottonwood (residues)	Chips	0	46
Pine (residues)	Chips	16,727	25
Pine-biomass	Chips	22,703	25
Pine-biomass (residues)	Chips	3,584	25
Spruce (residues)	Chips	4,983	27
Subalpine fir (residues)	Chips	192	23
		49,851	**25**

Transfer yard: Swannell dump

Aspen (residues)	Chips	948	30
Birch (residues)	Chips	60	22
Black spruce (residues)	Chips	364	50
Cottonwood (residues)	Chips	90	24
Pine (residues)	Chips	18,757	45
Pine-biomass	Chips	25,357	43
Pine-biomass (residues)	Chips	4,019	45
Spruce (residues)	Chips	7,685	43
Subalpine fir (residues)	Chips	457	52
		57,737	**44**

Transfer yard: Pete Toy dump

Aspen (residues)	Chips	203	8
Birch (residues)	Chips	563	8
Black spruce (residues)	Chips	178	8
Cottonwood (residues)	Chips	62	8
Pine (residues)	Chips	2,636	8
Pine-biomass	Chips	3,568	8
Pine-biomass (residues)	Chips	565	8
Spruce (residues)	Chips	1,605	8
Subalpine fir (residues)	Chips	126	8
		9,507	**8**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	2,158	20
Birch (residues)	Chips	0	7
Black spruce (residues)	Chips	315	51
Cottonwood (residues)	Chips	226	30
Pine (residues)	Chips	28,258	41
Pine-biomass	Chips	37,543	39
Pine-biomass (residues)	Chips	6,055	41
Spruce (residues)	Chips	13,124	37
Subalpine fir (residues)	Chips	1,654	34
		89,332	**39**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	738	3
Birch (residues)	Chips	99	2
Cottonwood (residues)	Chips	13	3
Pine (residues)	Chips	2,180	3
Pine-biomass	Chips	2,136	3
Pine-biomass (residues)	Chips	467	3
Spruce (residues)	Chips	1,265	3
Subalpine fir (residues)	Chips	134	3
		7,034	**3**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	9,769	26
Birch (residues)	Chips	3,525	32
Black spruce (residues)	Chips	169	33
Cottonwood (residues)	Chips	243	27
Pine (residues)	Chips	25,693	24
Pine-biomass	Chips	30,275	25
Pine-biomass (residues)	Chips	5,506	24
Spruce (residues)	Chips	15,133	26
Subalpine fir (residues)	Chips	1,217	22
		91,529	**25**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	1,214	6
Birch (residues)	Chips	54	9
Cottonwood (residues)	Chips	134	1
Pine (residues)	Chips	7,029	7
Pine-biomass	Chips	8,299	8
Pine-biomass (residues)	Chips	1,506	7
Spruce (residues)	Chips	6,473	8
Subalpine fir (residues)	Chips	734	10
		25,442	**8**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	1,384	12
Birch (residues)	Chips	166	14
Black spruce (residues)	Chips	247	18
Cottonwood (residues)	Chips	25	8
Pine (residues)	Chips	8,451	15
Pine-biomass	Chips	10,090	15
Pine-biomass (residues)	Chips	1,811	15
Spruce (residues)	Chips	9,335	15
Subalpine fir (residues)	Chips	1,551	13
		33,060	**15**

Transfer yard: Ospika dump

Aspen (residues)	Chips	11,496	17
Birch (residues)	Chips	5,434	18
Black spruce (residues)	Chips	1,176	18
Cottonwood (residues)	Chips	1,545	21
Pine (residues)	Chips	45,470	22
Pine-biomass	Chips	54,904	22
Pine-biomass (residues)	Chips	9,744	22
Spruce (residues)	Chips	32,383	24
Subalpine fir (residues)	Chips	6,518	23
		168,670	**22**

Transfer yard: Isola dump

Aspen (residues)	Chips	885	12
Birch (residues)	Chips	321	12
Black spruce (residues)	Chips	952	11
Cottonwood (residues)	Chips	15	13
Pine (residues)	Chips	9,078	13
Pine-biomass	Chips	12,661	13
Pine-biomass (residues)	Chips	1,945	13
Spruce (residues)	Chips	4,653	13
Subalpine fir (residues)	Chips	106	22
		30,617	**13**

Transfer yard: Deserters dump

Aspen (residues)	Chips	4,891	24
Birch (residues)	Chips	258	19
Black spruce (residues)	Chips	1,747	21
Cottonwood (residues)	Chips	566	16
Pine (residues)	Chips	30,020	20
Pine-biomass	Chips	37,491	20
Pine-biomass (residues)	Chips	6,433	20
Spruce (residues)	Chips	14,593	20
Subalpine fir (residues)	Chips	772	23
		96,770	**20**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	1,553	7
Birch (residues)	Chips	537	8
Black spruce (residues)	Chips	138	8
Cottonwood (residues)	Chips	121	10
Pine (residues)	Chips	14,802	10
Pine-biomass	Chips	20,803	10
Pine-biomass (residues)	Chips	3,172	10
Spruce (residues)	Chips	8,739	10
Subalpine fir (residues)	Chips	852	10
		50,718	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	2,791	25
Birch (residues)	Chips	87	7
Black spruce (residues)	Chips	649	55
Cottonwood (residues)	Chips	232	14
Pine (residues)	Chips	76,569	39
Pine-biomass	Chips	99,494	39
Pine-biomass (residues)	Chips	16,408	39
Spruce (residues)	Chips	29,353	36
Subalpine fir (residues)	Chips	4,135	39
		229,718	**38**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	13,476	42
Birch (residues)	Chips	3,301	46
Black spruce (residues)	Chips	562	17
Cottonwood (residues)	Chips	1,113	50
Pine (residues)	Chips	48,615	44
Pine-biomass	Chips	57,446	44
Pine-biomass (residues)	Chips	10,418	44
Spruce (residues)	Chips	27,725	53
Subalpine fir (residues)	Chips	3,341	54
		165,996	**45**
		1,518,181	**26**

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Statistics - Selected Items

Area	37,209.4 ha
Number of cut blocks	309
Recovered biomass	1,202,915.7 odt
Recovery rate	32.3 odt/ha
Biomass odt / Merchantable m³	0.1214 odt/m³
Delivered products	
• Chips	100 %
• Bundles	0 %
• Trunks and Residues	0 %
Energy balance	33 : 1
Available energy	4,292,460 MWh
Fuel consumption	12.4 L/odt

Cost

Harvesting	8.98 $/odt
Biomass recovery	27.27 $/odt
Transfer yard	3.10 $/odt
Transportation	28.88 $/odt
Stumpage fees	0.00 $/odt
Road network - Maintenance	1.28 $/odt
Indirect costs	0.00 $/odt
Total	**69.52 $/ odt**

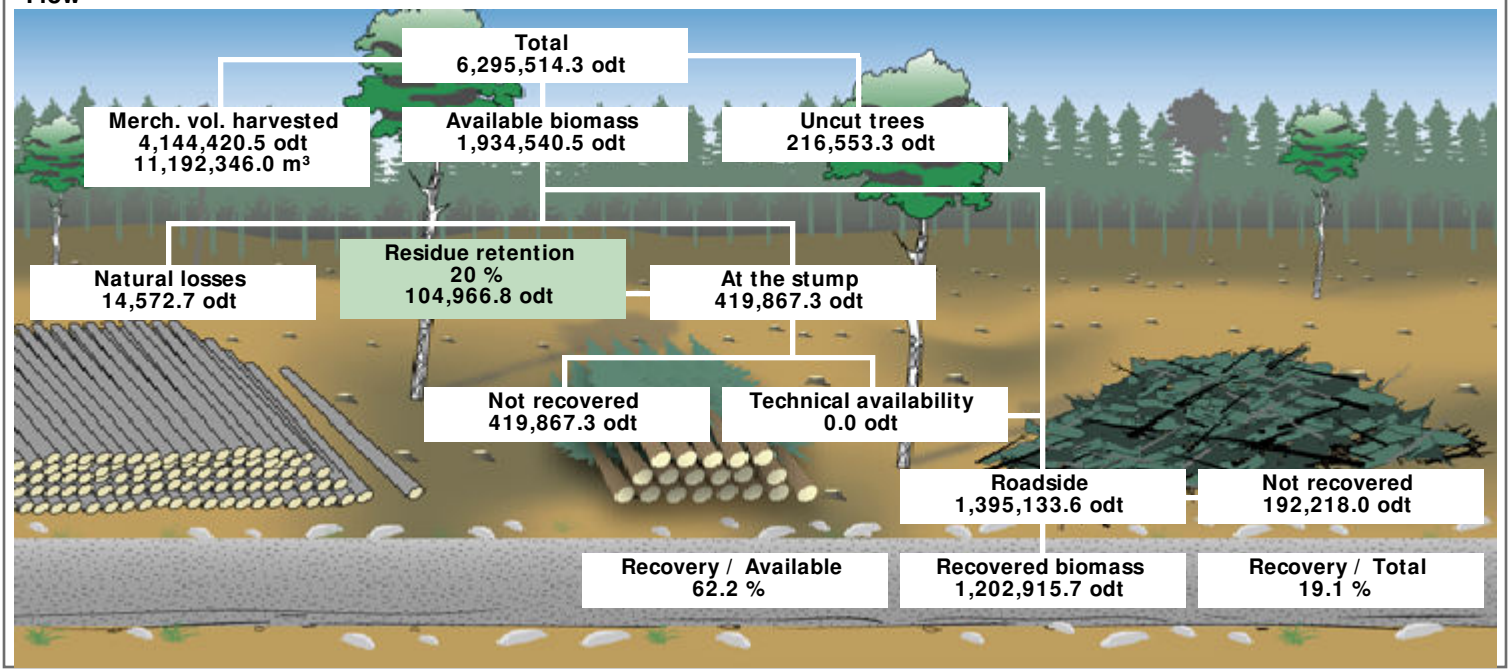
Revenue

Sale value	0.00 $/odt
Silvicultural discount	0.00 $/odt

Net

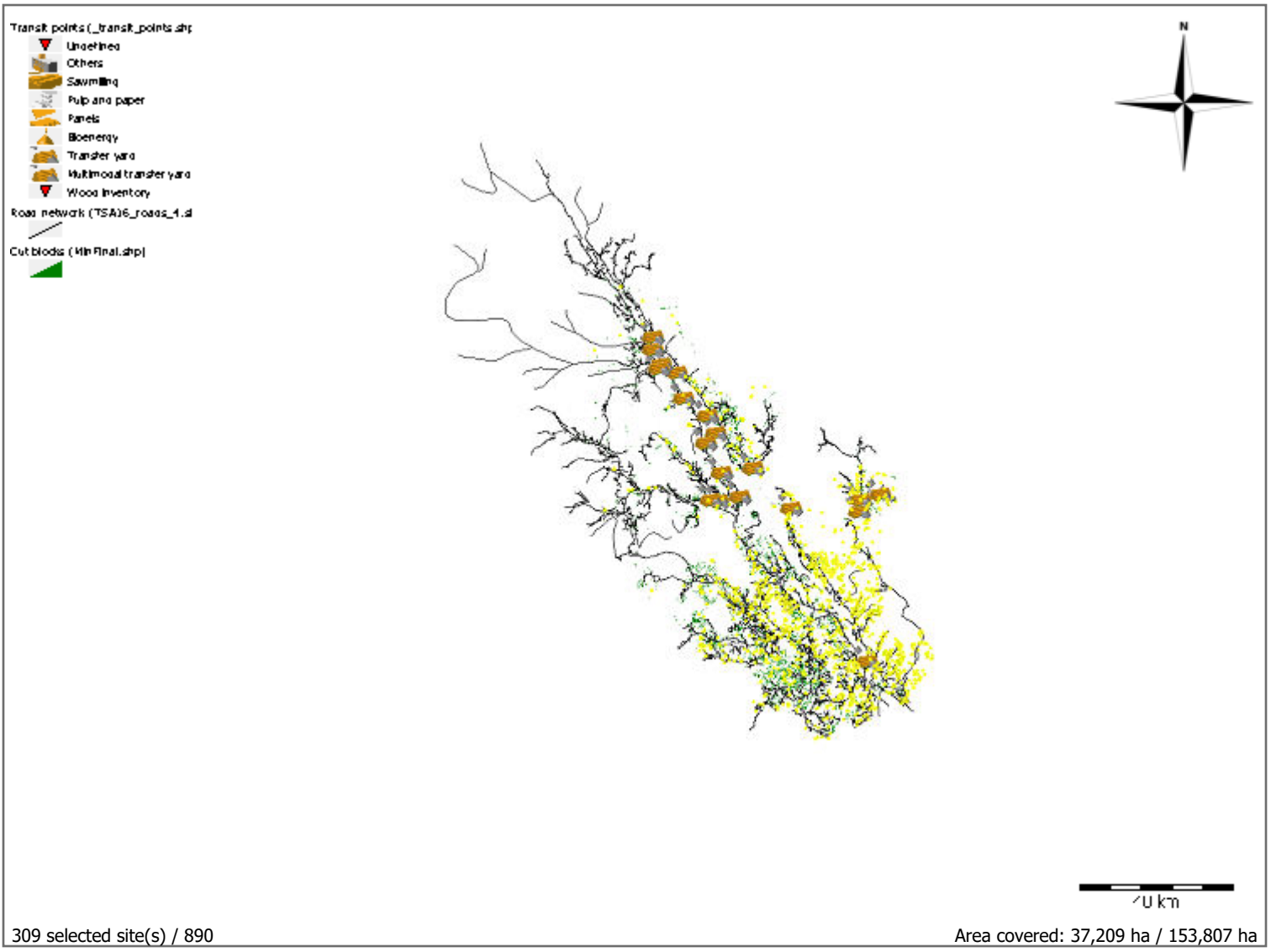
Profit	-69.52 $/odt

Flow



Products

Product name	odt	odt/ m³	odt/ ha
Spruce (residues)	472,892.4	0.1142	12.71
Subalpine fir (residues)	303,859.6	0.1066	8.17
Pine-biomass	161,994.6	16.0956	4.35
Pine (residues)	127,817.4	0.0768	3.44
Aspen (residues)	71,220.1	0.1108	1.91
Pine-biomass (residues)	27,389.4	0.0768	0.74
Birch (residues)	23,119.2	0.1862	0.62
Cottonwood (residues)	10,087.6	0.1154	0.27
Black spruce (residues)	4,487.0	0.1414	0.12
Douglas fir (residues)	48.4	0.1174	0.00
	1,202,915.7	**0.1214**	**32.33**



309 selected site(s) / 890

Area covered: 37,209 ha / 153,807 ha

Recovery summary

	Volume(odt)	Area(ha)	Number of cut blocks
• Biomass recovery location			
At the stump	0.0	0.0	0
Roadside	1,202,915.7	37,209.4	309
• Recovery season			
Summer	0.0	0.0	0
Winter	1,202,915.7	37,209.4	309
• Residue freshness			
Fresh	1,202,915.7	37,209.4	309
Brown	0.0	0.0	0
Brittle	0.0	0.0	0

Supply summary

Recovered biomass to	Merchantable volume (odt)	Residues (odt)	Total biomass (odt)
10 $/odt	0.0	0.0	0.0
20 $/odt	0.0	0.0	0.0
30 $/odt	0.0	16,210.3	16,210.3
40 $/odt	0.0	42,184.8	42,184.8
50 $/odt	0.0	300,038.2	300,038.2
60 $/odt	0.0	588,273.6	588,273.6
70 $/odt	0.0	796,118.7	796,118.7
80 $/odt	0.0	931,471.6	931,471.6
90 $/odt	120.2	1,005,190.5	1,005,310.7
100 $/odt	3,196.3	1,039,469.8	1,042,666.1
110 $/odt	12,850.9	1,040,921.1	1,053,771.9
120 $/odt	38,739.7	1,040,921.1	1,079,660.7
130 $/odt	73,180.0	1,040,921.1	1,114,101.0
140 $/odt	114,039.1	1,040,921.1	1,154,960.2
150 $/odt	149,458.1	1,040,921.1	1,190,379.2
160 $/odt	158,987.1	1,040,921.1	1,199,908.2
170 $/odt	161,923.9	1,040,921.1	1,202,845.0
180 $/odt	161,994.6	1,040,921.1	1,202,915.7
Maximum cost	**171.36 $/ odt**	**104.33 $/ odt**	

Delivery to mills

Destination / Product	Format	odt	Transport average distance (Km)
< Closest transfer yard>			
Aspen (residues)	Chips	4,081	0
Birch (residues)	Chips	1,266	0
Cottonwood (residues)	Chips	559	0
Pine (residues)	Chips	2,239	0
Pine-biomass	Chips	2,930	0
Pine-biomass (residues)	Chips	480	0
Spruce (residues)	Chips	6,836	0
Subalpine fir (residues)	Chips	750	0
		19,141	**0**
Transfer yard: Raspberry dump			
Aspen (residues)	Chips	1,841	60
Birch (residues)	Chips	513	34
Black spruce (residues)	Chips	582	69
Cottonwood (residues)	Chips	57	41
Pine (residues)	Chips	5,269	61
Pine-biomass	Chips	6,256	61
Pine-biomass (residues)	Chips	1,129	61
Spruce (residues)	Chips	14,207	56
Subalpine fir (residues)	Chips	4,566	47
		34,421	**57**
Transfer yard: Chunamon dump			
Aspen (residues)	Chips	92	5
Cottonwood (residues)	Chips	125	5
Pine (residues)	Chips	151	5
Pine-biomass	Chips	232	5
Pine-biomass (residues)	Chips	32	5
Spruce (residues)	Chips	448	5
Subalpine fir (residues)	Chips	365	5
		1,444	**5**

Transfer yard: S Fort Grahame dump

Aspen (residues)	Chips	688	16
Birch (residues)	Chips	2,079	15
Black spruce (residues)	Chips	43	16
Cottonwood (residues)	Chips	10	22
Pine (residues)	Chips	3,116	18
Pine-biomass	Chips	3,623	17
Pine-biomass (residues)	Chips	668	18
Spruce (residues)	Chips	4,333	14
Subalpine fir (residues)	Chips	1,895	18
		16,455	**16**

Transfer yard: Fort Grahame dump

Aspen (residues)	Chips	299	16
Birch (residues)	Chips	55	10
Black spruce (residues)	Chips	23	18
Pine (residues)	Chips	582	10
Pine-biomass	Chips	679	10
Pine-biomass (residues)	Chips	125	10
Spruce (residues)	Chips	855	9
Subalpine fir (residues)	Chips	375	7
		2,993	**10**

Transfer yard: Chowika dump

Aspen (residues)	Chips	1,278	16
Birch (residues)	Chips	1,779	19
Black spruce (residues)	Chips	94	23
Cottonwood (residues)	Chips	213	19
Pine (residues)	Chips	2,000	20
Pine-biomass	Chips	3,067	19
Pine-biomass (residues)	Chips	429	20
Spruce (residues)	Chips	4,414	17
Subalpine fir (residues)	Chips	754	15
		14,027	**18**

Transfer yard: Swannell dump

Aspen (residues)	Chips	488	26
Birch (residues)	Chips	0	26
Pine (residues)	Chips	123	26
Pine-biomass	Chips	214	26
Pine-biomass (residues)	Chips	26	26
Spruce (residues)	Chips	46	26
		897	**26**

Transfer yard: Pete Toy dump

Spruce (residues)	Chips	1,424	16
Subalpine fir (residues)	Chips	1,751	16
		3,175	**16**

Transfer yard: Mesilinka dump

Aspen (residues)	Chips	148	37
Black spruce (residues)	Chips	2	31
Cottonwood (residues)	Chips	343	41
Pine (residues)	Chips	1,126	40
Pine-biomass	Chips	1,532	39
Pine-biomass (residues)	Chips	241	40
Spruce (residues)	Chips	5,884	32
Subalpine fir (residues)	Chips	1,039	26
		10,315	**34**

Transfer yard: E Bear Valley dump

Aspen (residues)	Chips	46	4
Birch (residues)	Chips	1	4
Cottonwood (residues)	Chips	8	4
Pine (residues)	Chips	328	4
Pine-biomass	Chips	375	4
Pine-biomass (residues)	Chips	70	4
Spruce (residues)	Chips	2,064	4
Subalpine fir (residues)	Chips	479	4
		3,372	**4**

Transfer yard: Finlay Forks dump

Aspen (residues)	Chips	7,754	17
Birch (residues)	Chips	1,530	27
Black spruce (residues)	Chips	4	32
Cottonwood (residues)	Chips	233	17
Pine (residues)	Chips	3,481	25
Pine-biomass	Chips	4,483	25
Pine-biomass (residues)	Chips	746	25
Spruce (residues)	Chips	21,789	26
Subalpine fir (residues)	Chips	14,192	30
		54,213	**25**

Transfer yard: Nabesche dump

Aspen (residues)	Chips	343	10
Birch (residues)	Chips	216	10
Cottonwood (residues)	Chips	26	10
Pine (residues)	Chips	455	10
Pine-biomass	Chips	541	10
Pine-biomass (residues)	Chips	97	10
Spruce (residues)	Chips	3,440	9
Subalpine fir (residues)	Chips	1,247	8
		6,365	**9**

Transfer yard: Bear Valley dump

Aspen (residues)	Chips	518	10
Birch (residues)	Chips	34	5
Black spruce (residues)	Chips	48	14
Cottonwood (residues)	Chips	37	14
Pine (residues)	Chips	1,643	12
Pine-biomass	Chips	1,836	12
Pine-biomass (residues)	Chips	352	12
Spruce (residues)	Chips	8,871	16
Subalpine fir (residues)	Chips	2,240	17
		15,578	**15**

Transfer yard: Ospika dump

	Aspen (residues)	Chips	1,953	13
	Birch (residues)	Chips	1,988	18
	Black spruce (residues)	Chips	92	11
	Cottonwood (residues)	Chips	270	12
	Pine (residues)	Chips	2,047	16
	Pine-biomass	Chips	2,474	15
	Pine-biomass (residues)	Chips	439	16
	Spruce (residues)	Chips	4,400	19
	Subalpine fir (residues)	Chips	2,725	23
			16,389	**18**

Transfer yard: Isola dump

	Aspen (residues)	Chips	17	20
	Cottonwood (residues)	Chips	115	32
	Pine (residues)	Chips	202	21
	Pine-biomass	Chips	247	20
	Pine-biomass (residues)	Chips	43	21
	Spruce (residues)	Chips	676	31
	Subalpine fir (residues)	Chips	194	19
			1,496	**26**

Transfer yard: Deserters dump

	Aspen (residues)	Chips	208	22
	Cottonwood (residues)	Chips	298	24
	Pine (residues)	Chips	244	16
	Pine-biomass	Chips	392	15
	Pine-biomass (residues)	Chips	52	16
	Spruce (residues)	Chips	288	21
			1,482	**19**

Transfer yard: Factor Ross dump

Aspen (residues)	Chips	117	9
Birch (residues)	Chips	395	7
Cottonwood (residues)	Chips	0	7
Pine (residues)	Chips	326	10
Pine-biomass	Chips	463	10
Pine-biomass (residues)	Chips	70	10
Spruce (residues)	Chips	642	11
Subalpine fir (residues)	Chips	55	12
		2,068	**10**

Transfer yard: Omineca dump

Aspen (residues)	Chips	185	29
Black spruce (residues)	Chips	57	36
Cottonwood (residues)	Chips	2	42
Pine (residues)	Chips	2,224	11
Pine-biomass	Chips	2,526	12
Pine-biomass (residues)	Chips	477	11
Spruce (residues)	Chips	5,270	30
Subalpine fir (residues)	Chips	2,097	26
		12,837	**22**

Transfer yard: Mackenzie mill

Aspen (residues)	Chips	51,164	48
Birch (residues)	Chips	13,262	44
Black spruce (residues)	Chips	3,542	83
Cottonwood (residues)	Chips	7,791	39
Douglas fir (residues)	Chips	48	29
Pine (residues)	Chips	102,262	90
Pine-biomass	Chips	130,126	87
Pine-biomass (residues)	Chips	21,913	90
Spruce (residues)	Chips	387,005	72
Subalpine fir (residues)	Chips	269,137	61
		986,250	**72**

	1,202,916	63

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	153,807.3 ha
Number of cut blocks	890
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	153,807.3 ha
Harvesting system	
Full-tree with roadside processing	153,807.3 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.80 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.53 $/m³
Transportation	12.21 $/m³
Transfer yard	3.62 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**44.91 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-44.91 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	18,725,015	121.7	0.313	46
Spruce	Logs	11,285,281	73.4	0.381	28
Pine-biomass	Logs	4,012,503	26.1	0.313	10
Subalpine fir	Logs	3,905,857	25.4	0.280	10
Aspen	Logs	1,814,988	11.8	0.231	4
Birch	Logs	279,657	1.8	0.282	1
Black spruce	Logs	233,131	1.5	0.200	1
Cottonwood	Logs	169,004	1.1	0.388	0
Douglas fir	Logs	413	0.0	0.899	0
		40,425,850	**262.8**	**0.355**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	55,040	0
	Birch	Logs	8,365	0
	Cottonwood	Logs	6,077	0
	Pine	Logs	152,808	0
	Spruce	Logs	131,796	0
	Subalpine fir	Logs	15,344	0
			369,430	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	175,233	86
	Birch	Logs	11,915	34
	Black spruce	Logs	58,703	104
	Cottonwood	Logs	11,222	101
	Pine	Logs	5,283,424	114
	Spruce	Logs	2,993,639	115
	Subalpine fir	Logs	558,186	111
			9,092,322	**113**

Transfer yard: Chunamon dump

Aspen	Logs	10,856	15
Birch	Logs	2,796	22
Black spruce	Logs	3,071	15
Cottonwood	Logs	5,351	15
Pine	Logs	108,879	13
Spruce	Logs	35,984	13
Subalpine fir	Logs	7,943	9
		174,882	**13**

Transfer yard: S Fort Grahame dump

Aspen	Logs	69,395	14
Birch	Logs	24,119	14
Black spruce	Logs	5,081	16
Cottonwood	Logs	2,973	16
Pine	Logs	782,091	16
Spruce	Logs	346,508	16
Subalpine fir	Logs	89,845	18
		1,320,012	**16**

Transfer yard: Fort Grahame dump

Aspen	Logs	20,620	6
Birch	Logs	3,959	8
Black spruce	Logs	1,708	6
Cottonwood	Logs	693	7
Pine	Logs	172,603	9
Spruce	Logs	74,986	9
Subalpine fir	Logs	23,839	13
		298,408	**9**

Transfer yard: Chowika dump

Aspen	Logs	28,706	14
Birch	Logs	17,212	16
Black spruce	Logs	747	21
Cottonwood	Logs	3,032	16
Pine	Logs	189,063	17
Spruce	Logs	120,342	15
Subalpine fir	Logs	20,641	16
		379,743	**16**

Transfer yard: Ingenika dump

Aspen	Logs	2,628	26
Birch	Logs	1,030	26
Black spruce	Logs	8,478	25
Cottonwood	Logs	4	46
Pine	Logs	235,410	25
Spruce	Logs	44,009	27
Subalpine fir	Logs	1,785	23
		293,344	**26**

Transfer yard: Swannell dump

Aspen	Logs	14,170	27
Birch	Logs	303	19
Black spruce	Logs	2,379	51
Cottonwood	Logs	846	25
Pine	Logs	274,328	44
Spruce	Logs	68,130	42
Subalpine fir	Logs	3,656	52
		363,811	**43**

Transfer yard: Pete Toy dump

Aspen	Logs	1,831	8
Birch	Logs	2,907	8
Black spruce	Logs	1,306	8
Cottonwood	Logs	573	8
Pine	Logs	36,980	8
Spruce	Logs	29,672	12
Subalpine fir	Logs	20,740	15
		94,010	**11**

Transfer yard: Mesilinka dump

Aspen	Logs	19,668	19
Birch	Logs	2	7
Black spruce	Logs	2,041	50
Cottonwood	Logs	5,209	37
Pine	Logs	404,016	39
Spruce	Logs	178,157	35
Subalpine fir	Logs	27,276	30
		636,369	**37**

Transfer yard: E Bear Valley dump

Aspen	Logs	5,078	3
Birch	Logs	375	3
Cottonwood	Logs	141	3
Pine	Logs	24,820	3
Spruce	Logs	24,752	4
Subalpine fir	Logs	4,512	4
		59,678	**4**

Transfer yard: Finlay Forks dump

Aspen	Logs	150,411	22
Birch	Logs	28,105	31
Black spruce	Logs	1,097	33
Cottonwood	Logs	3,372	23
Pine	Logs	353,758	25
Spruce	Logs	319,079	26
Subalpine fir	Logs	152,980	27
		1,008,803	**25**

Transfer yard: Nabesche dump

Aspen	Logs	10,805	7
Birch	Logs	1,050	10
Cottonwood	Logs	1,341	3
Pine	Logs	89,803	8
Spruce	Logs	84,532	9
Subalpine fir	Logs	17,800	9
		205,331	**8**

Transfer yard: Bear Valley dump

Aspen	Logs	14,993	11
Birch	Logs	1,001	12
Black spruce	Logs	1,738	17
Cottonwood	Logs	569	12
Pine	Logs	121,165	15
Spruce	Logs	150,892	15
Subalpine fir	Logs	30,432	15
		320,790	**15**

Transfer yard: Ospika dump

Aspen	Logs	112,884	17
Birch	Logs	35,115	18
Black spruce	Logs	8,236	18
Cottonwood	Logs	15,829	20
Pine	Logs	584,933	22
Spruce	Logs	302,180	23
Subalpine fir	Logs	77,779	23
		1,136,955	**22**

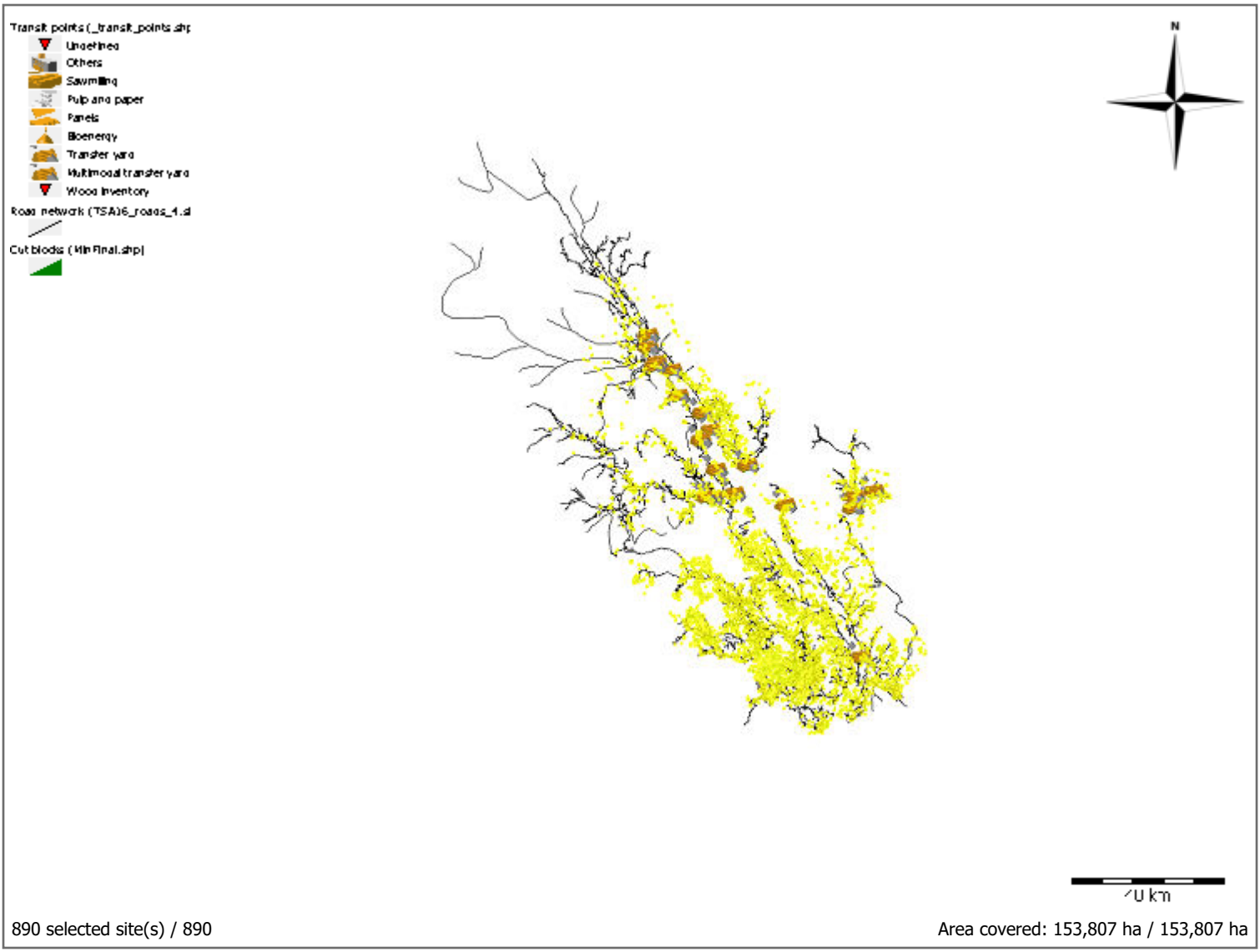
Transfer yard: Isola dump

Aspen	Logs	7,648	12
Birch	Logs	1,607	12
Black spruce	Logs	7,100	11
Cottonwood	Logs	959	30
Pine	Logs	134,288	13
Spruce	Logs	46,859	15
Subalpine fir	Logs	3,221	20
		201,682	**14**

Transfer yard: Deserters dump

Aspen	Logs	42,942	24
Birch	Logs	1,140	19
Black spruce	Logs	11,114	19
Cottonwood	Logs	8,199	19
Pine	Logs	388,404	20
Spruce	Logs	122,177	20
Subalpine fir	Logs	7,150	23
		581,125	**20**

Transfer yard: Factor Ross dump				
	Aspen	Logs	13,921	7
	Birch	Logs	5,389	7
	Black spruce	Logs	808	9
	Cottonwood	Logs	1,035	10
	Pine	Logs	221,592	9
	Spruce	Logs	87,566	10
	Subalpine fir	Logs	8,382	10
			338,694	**9**
Transfer yard: Omineca dump				
	Aspen	Logs	33,458	23
	Birch	Logs	1,748	10
	Black spruce	Logs	5,374	51
	Cottonwood	Logs	2,138	15
	Pine	Logs	1,297,362	33
	Spruce	Logs	386,536	32
	Subalpine fir	Logs	72,722	28
			1,799,336	**32**
Transfer yard: Mackenzie mill				
	Aspen	Logs	1,024,702	54
	Birch	Logs	131,518	49
	Black spruce	Logs	114,151	79
	Cottonwood	Logs	99,442	46
	Douglas fir	Logs	413	29
	Pine	Logs	7,869,286	73
	Spruce	Logs	5,737,487	65
	Subalpine fir	Logs	2,761,625	57
			17,738,623	**67**
			36,413,347	**67**



890 selected site(s) / 890

Area covered: 153,807 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	153,807.3 ha
Number of cut blocks	890
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	153,807.3 ha
Harvesting system	
Full-tree with roadside processing	153,807.3 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.80 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.53 $/m³
Transportation	12.21 $/m³
Transfer yard	3.62 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**44.91 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-44.91 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	18,725,015	121.7	0.313	46
Spruce	Logs	11,285,281	73.4	0.381	28
Pine-biomass	Logs	4,012,503	26.1	0.313	10
Subalpine fir	Logs	3,905,857	25.4	0.280	10
Aspen	Logs	1,814,988	11.8	0.231	4
Birch	Logs	279,657	1.8	0.282	1
Black spruce	Logs	233,131	1.5	0.200	1
Cottonwood	Logs	169,004	1.1	0.388	0
Douglas fir	Logs	413	0.0	0.899	0
		40,425,850	**262.8**	**0.355**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	55,040	0
	Birch	Logs	8,365	0
	Cottonwood	Logs	6,077	0
	Pine	Logs	152,808	0
	Spruce	Logs	131,796	0
	Subalpine fir	Logs	15,344	0
			369,430	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	175,233	86
	Birch	Logs	11,915	34
	Black spruce	Logs	58,703	104
	Cottonwood	Logs	11,222	101
	Pine	Logs	5,283,424	114
	Spruce	Logs	2,993,639	115
	Subalpine fir	Logs	558,186	111
			9,092,322	**113**

Transfer yard: Chunamon dump

Aspen	Logs	10,856	15
Birch	Logs	2,796	22
Black spruce	Logs	3,071	15
Cottonwood	Logs	5,351	15
Pine	Logs	108,879	13
Spruce	Logs	35,984	13
Subalpine fir	Logs	7,943	9
		174,882	**13**

Transfer yard: S Fort Grahame dump

Aspen	Logs	69,395	14
Birch	Logs	24,119	14
Black spruce	Logs	5,081	16
Cottonwood	Logs	2,973	16
Pine	Logs	782,091	16
Spruce	Logs	346,508	16
Subalpine fir	Logs	89,845	18
		1,320,012	**16**

Transfer yard: Fort Grahame dump

Aspen	Logs	20,620	6
Birch	Logs	3,959	8
Black spruce	Logs	1,708	6
Cottonwood	Logs	693	7
Pine	Logs	172,603	9
Spruce	Logs	74,986	9
Subalpine fir	Logs	23,839	13
		298,408	**9**

Transfer yard: Chowika dump

Aspen	Logs	28,706	14
Birch	Logs	17,212	16
Black spruce	Logs	747	21
Cottonwood	Logs	3,032	16
Pine	Logs	189,063	17
Spruce	Logs	120,342	15
Subalpine fir	Logs	20,641	16
		379,743	**16**

Transfer yard: Ingenika dump

Aspen	Logs	2,628	26
Birch	Logs	1,030	26
Black spruce	Logs	8,478	25
Cottonwood	Logs	4	46
Pine	Logs	235,410	25
Spruce	Logs	44,009	27
Subalpine fir	Logs	1,785	23
		293,344	**26**

Transfer yard: Swannell dump

Aspen	Logs	14,170	27
Birch	Logs	303	19
Black spruce	Logs	2,379	51
Cottonwood	Logs	846	25
Pine	Logs	274,328	44
Spruce	Logs	68,130	42
Subalpine fir	Logs	3,656	52
		363,811	**43**

Transfer yard: Pete Toy dump

Aspen	Logs	1,831	8
Birch	Logs	2,907	8
Black spruce	Logs	1,306	8
Cottonwood	Logs	573	8
Pine	Logs	36,980	8
Spruce	Logs	29,672	12
Subalpine fir	Logs	20,740	15
		94,010	**11**

Transfer yard: Mesilinka dump

Aspen	Logs	19,668	19
Birch	Logs	2	7
Black spruce	Logs	2,041	50
Cottonwood	Logs	5,209	37
Pine	Logs	404,016	39
Spruce	Logs	178,157	35
Subalpine fir	Logs	27,276	30
		636,369	**37**

Transfer yard: E Bear Valley dump

Aspen	Logs	5,078	3
Birch	Logs	375	3
Cottonwood	Logs	141	3
Pine	Logs	24,820	3
Spruce	Logs	24,752	4
Subalpine fir	Logs	4,512	4
		59,678	**4**

Transfer yard: Finlay Forks dump

Aspen	Logs	150,411	22
Birch	Logs	28,105	31
Black spruce	Logs	1,097	33
Cottonwood	Logs	3,372	23
Pine	Logs	353,758	25
Spruce	Logs	319,079	26
Subalpine fir	Logs	152,980	27
		1,008,803	**25**

Transfer yard: Nabesche dump

Aspen	Logs	10,805	7
Birch	Logs	1,050	10
Cottonwood	Logs	1,341	3
Pine	Logs	89,803	8
Spruce	Logs	84,532	9
Subalpine fir	Logs	17,800	9
		205,331	**8**

Transfer yard: Bear Valley dump

Aspen	Logs	14,993	11
Birch	Logs	1,001	12
Black spruce	Logs	1,738	17
Cottonwood	Logs	569	12
Pine	Logs	121,165	15
Spruce	Logs	150,892	15
Subalpine fir	Logs	30,432	15
		320,790	**15**

Transfer yard: Ospika dump

Aspen	Logs	112,884	17
Birch	Logs	35,115	18
Black spruce	Logs	8,236	18
Cottonwood	Logs	15,829	20
Pine	Logs	584,933	22
Spruce	Logs	302,180	23
Subalpine fir	Logs	77,779	23
		1,136,955	**22**

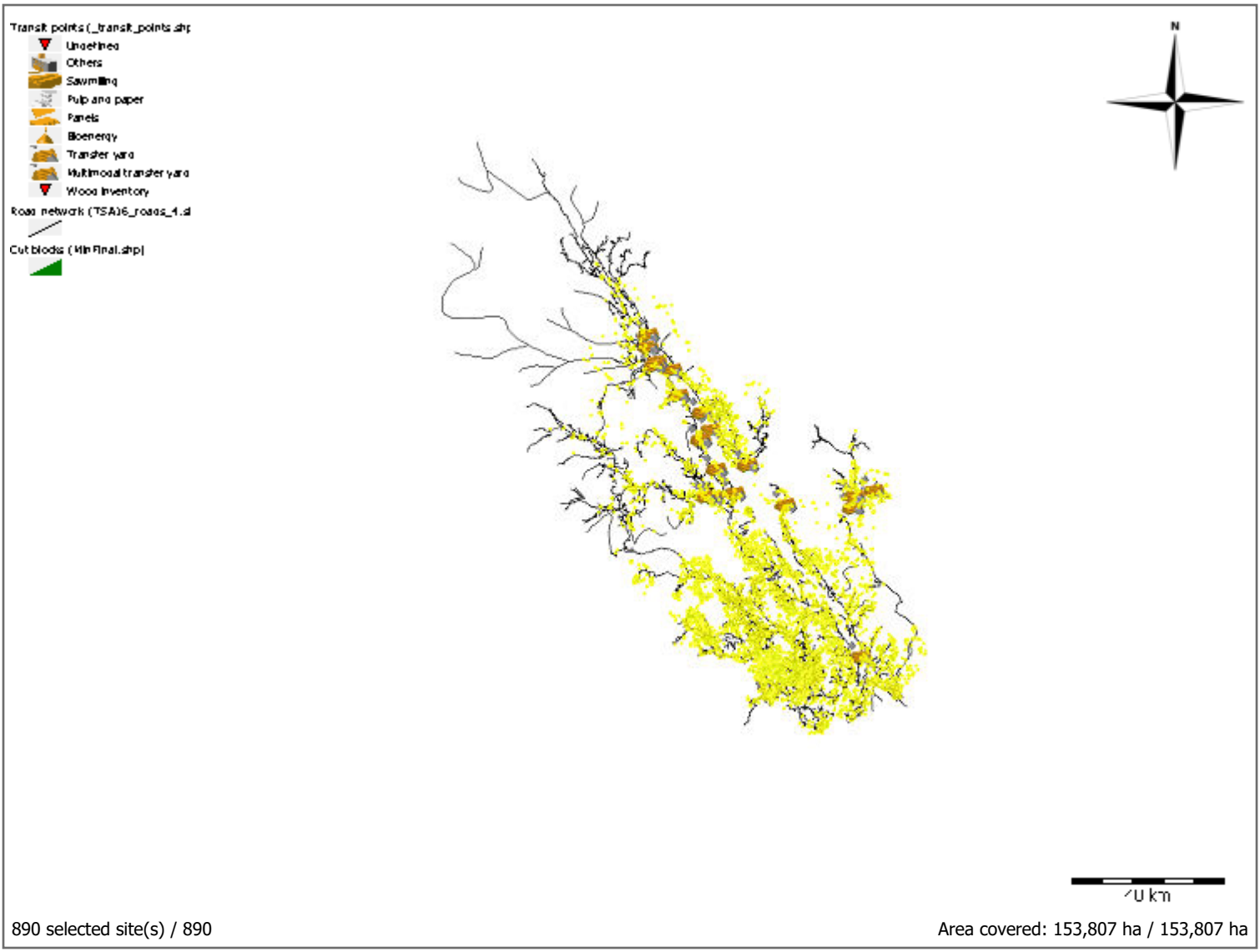
Transfer yard: Isola dump

Aspen	Logs	7,648	12
Birch	Logs	1,607	12
Black spruce	Logs	7,100	11
Cottonwood	Logs	959	30
Pine	Logs	134,288	13
Spruce	Logs	46,859	15
Subalpine fir	Logs	3,221	20
		201,682	**14**

Transfer yard: Deserters dump

Aspen	Logs	42,942	24
Birch	Logs	1,140	19
Black spruce	Logs	11,114	19
Cottonwood	Logs	8,199	19
Pine	Logs	388,404	20
Spruce	Logs	122,177	20
Subalpine fir	Logs	7,150	23
		581,125	**20**

Transfer yard: Factor Ross dump				
	Aspen	Logs	13,921	7
	Birch	Logs	5,389	7
	Black spruce	Logs	808	9
	Cottonwood	Logs	1,035	10
	Pine	Logs	221,592	9
	Spruce	Logs	87,566	10
	Subalpine fir	Logs	8,382	10
			338,694	**9**
Transfer yard: Omineca dump				
	Aspen	Logs	33,458	23
	Birch	Logs	1,748	10
	Black spruce	Logs	5,374	51
	Cottonwood	Logs	2,138	15
	Pine	Logs	1,297,362	33
	Spruce	Logs	386,536	32
	Subalpine fir	Logs	72,722	28
			1,799,336	**32**
Transfer yard: Mackenzie mill				
	Aspen	Logs	1,024,702	54
	Birch	Logs	131,518	49
	Black spruce	Logs	114,151	79
	Cottonwood	Logs	99,442	46
	Douglas fir	Logs	413	29
	Pine	Logs	7,869,286	73
	Spruce	Logs	5,737,487	65
	Subalpine fir	Logs	2,761,625	57
			17,738,623	**67**
			36,413,347	**67**



890 selected site(s) / 890

Area covered: 153,807 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	36,430.9 ha
Number of cut blocks	163
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	36,430.9 ha
Harvesting system	
Full-tree with roadside processing	36,430.9 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	28.01 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.77 $/m³
Transportation	14.86 $/m³
Transfer yard	2.93 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**47.31 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-47.31 $/m³

Products

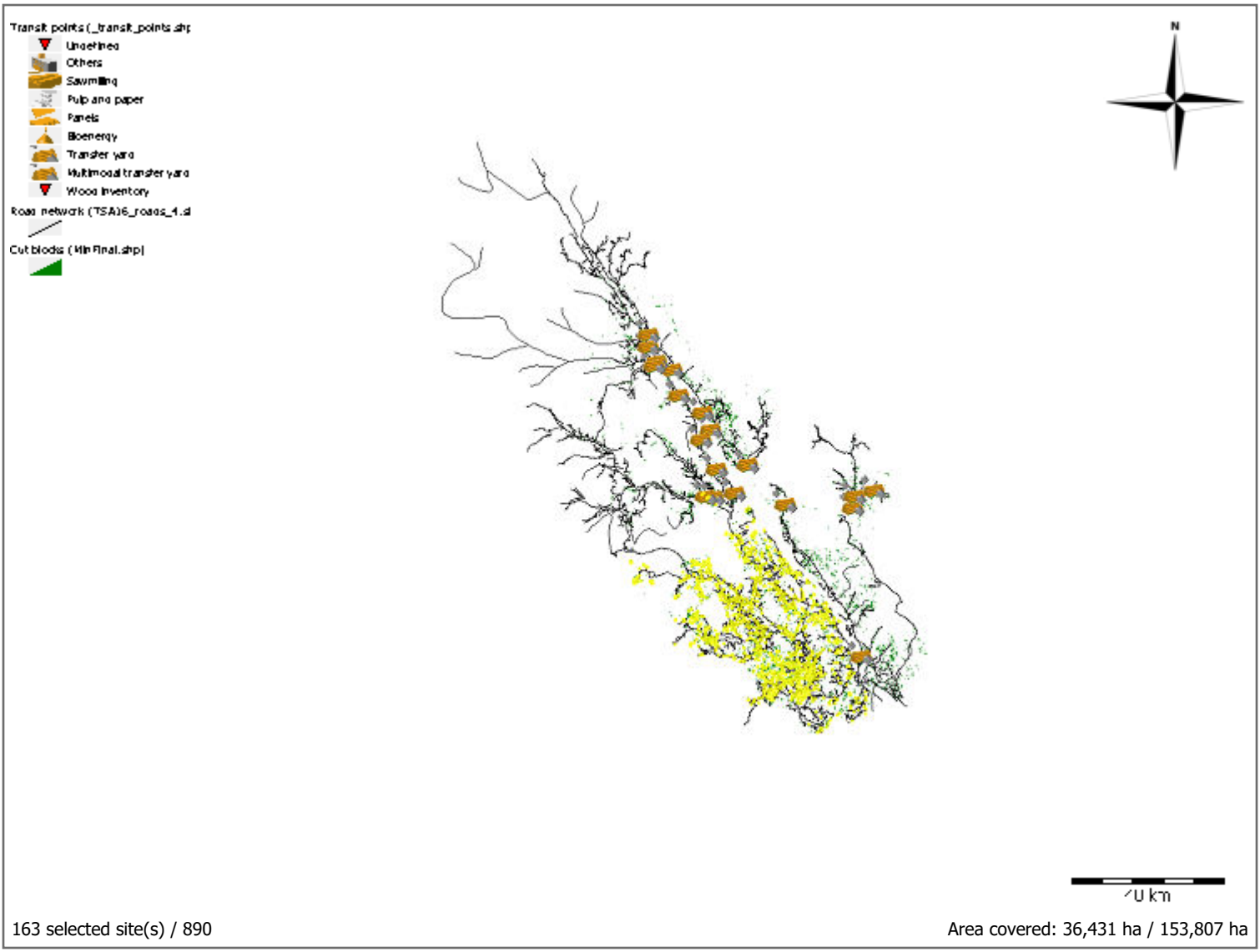
Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,625,272	154.4	0.304	57
Spruce	Logs	2,410,581	66.2	0.357	24
Pine-biomass	Logs	1,205,415	33.1	0.304	12
Subalpine fir	Logs	310,958	8.5	0.253	3
Aspen	Logs	251,771	6.9	0.196	3
Black spruce	Logs	61,661	1.7	0.191	1
Birch	Logs	21,820	0.6	0.279	0
Cottonwood	Logs	15,809	0.4	0.348	0
		9,903,288	**271.8**	**0.351**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
Transfer yard: Raspberry dump				
	Aspen	Logs	53,469	87
	Birch	Logs	2,351	66
	Black spruce	Logs	20,561	101
	Cottonwood	Logs	4,134	87
	Pine	Logs	2,261,194	115
	Spruce	Logs	1,065,478	113
	Subalpine fir	Logs	139,404	111
			3,546,593	**114**
Transfer yard: Omineca dump				
	Aspen	Logs	1,581	6
	Pine	Logs	67,071	5
	Spruce	Logs	24,414	5
	Subalpine fir	Logs	2,689	10
			95,755	**5**

Transfer yard: Mackenzie mill

	Aspen	Logs	196,721	71
	Birch	Logs	19,469	66
	Black spruce	Logs	41,100	79
	Cottonwood	Logs	11,675	70
	Pine	Logs	3,297,007	75
	Spruce	Logs	1,320,689	76
	Subalpine fir	Logs	168,864	77
			5,055,525	**75**
			8,697,872	**90**



163 selected site(s) / 890

Area covered: 36,431 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	41,937.8 ha
Number of cut blocks	175
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	41,937.8 ha
Harvesting system	
Full-tree with roadside processing	41,937.8 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	28.68 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.77 $/m³
Transportation	15.31 $/m³
Transfer yard	3.17 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**48.68 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-48.68 $/m³

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	38,229.2 ha
Number of cut blocks	243
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	38,229.2 ha
Harvesting system	
Full-tree with roadside processing	38,229.2 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.36 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.13 $/m³
Transportation	8.01 $/m³
Transfer yard	6.43 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**42.69 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-42.69 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,835,008	152.6	0.361	57
Spruce	Logs	2,125,649	55.6	0.407	21
Pine-biomass	Logs	1,250,359	32.7	0.361	12
Aspen	Logs	567,001	14.8	0.231	5
Subalpine fir	Logs	324,417	8.5	0.262	3
Birch	Logs	111,555	2.9	0.274	1
Black spruce	Logs	62,713	1.6	0.226	1
Cottonwood	Logs	49,338	1.3	0.400	0
		10,326,041	**270.1**	**0.399**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	20,020	0
	Birch	Logs	2,560	0
	Cottonwood	Logs	1,849	0
	Pine	Logs	122,578	0
	Spruce	Logs	69,328	0
	Subalpine fir	Logs	8,148	0
			224,483	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	16,048	19
	Birch	Logs	4,839	8
	Black spruce	Logs	1,615	19
	Cottonwood	Logs	112	12
	Pine	Logs	197,614	10
	Spruce	Logs	35,893	9
	Subalpine fir	Logs	4,649	10
			260,771	**11**

Transfer yard: Chunamon dump

Aspen	Logs	9,948	16
Birch	Logs	2,796	22
Black spruce	Logs	3,071	15
Cottonwood	Logs	4,177	18
Pine	Logs	106,433	13
Spruce	Logs	31,763	14
Subalpine fir	Logs	5,505	10
		163,694	**14**

Transfer yard: S Fort Grahame dump

Aspen	Logs	63,448	14
Birch	Logs	13,972	13
Black spruce	Logs	4,844	16
Cottonwood	Logs	2,900	16
Pine	Logs	745,338	16
Spruce	Logs	310,011	17
Subalpine fir	Logs	75,888	19
		1,216,401	**16**

Transfer yard: Fort Grahame dump

Aspen	Logs	18,923	5
Birch	Logs	3,699	8
Black spruce	Logs	1,579	5
Cottonwood	Logs	693	7
Pine	Logs	165,718	9
Spruce	Logs	68,700	9
Subalpine fir	Logs	20,855	14
		280,167	**9**

Transfer yard: Chowika dump

Aspen	Logs	15,509	12
Birch	Logs	7,822	14
Black spruce	Logs	211	15
Cottonwood	Logs	1,322	12
Pine	Logs	156,733	16
Spruce	Logs	79,762	15
Subalpine fir	Logs	14,318	16
		275,677	**15**

Transfer yard: Ingenika dump

Aspen	Logs	2,628	26
Birch	Logs	1,030	26
Black spruce	Logs	8,478	25
Cottonwood	Logs	4	46
Pine	Logs	235,410	25
Spruce	Logs	44,009	27
Subalpine fir	Logs	1,785	23
		293,344	**26**

Transfer yard: Swannell dump

Aspen	Logs	8,659	28
Birch	Logs	303	19
Black spruce	Logs	2,379	51
Cottonwood	Logs	846	25
Pine	Logs	272,043	45
Spruce	Logs	67,677	42
Subalpine fir	Logs	3,656	52
		355,562	**44**

Transfer yard: Pete Toy dump

Aspen	Logs	1,831	8
Birch	Logs	2,907	8
Black spruce	Logs	1,306	8
Cottonwood	Logs	573	8
Pine	Logs	36,980	8
Spruce	Logs	15,882	8
Subalpine fir	Logs	1,311	8
		60,791	**8**

Transfer yard: Mesilinka dump

Aspen	Logs	18,334	18
Birch	Logs	2	7
Black spruce	Logs	2,022	50
Cottonwood	Logs	2,023	31
Pine	Logs	388,123	39
Spruce	Logs	116,892	37
Subalpine fir	Logs	15,383	33
		542,779	**38**

Transfer yard: E Bear Valley dump

Aspen	Logs	4,626	3
Birch	Logs	370	3
Cottonwood	Logs	89	3
Pine	Logs	21,025	3
Spruce	Logs	8,361	3
Subalpine fir	Logs	826	3
		35,298	**3**

Transfer yard: Finlay Forks dump

Aspen	Logs	83,164	26
Birch	Logs	19,488	31
Black spruce	Logs	1,073	33
Cottonwood	Logs	1,789	27
Pine	Logs	307,608	25
Spruce	Logs	127,130	27
Subalpine fir	Logs	9,972	20
		550,224	**26**

Transfer yard: Nabesche dump

Aspen	Logs	8,487	6
Birch	Logs	294	10
Cottonwood	Logs	1,098	1
Pine	Logs	84,304	8
Spruce	Logs	54,659	8
Subalpine fir	Logs	5,980	10
		154,822	**8**

Transfer yard: Bear Valley dump

Aspen	Logs	10,508	11
Birch	Logs	822	14
Black spruce	Logs	1,413	18
Cottonwood	Logs	199	8
Pine	Logs	102,682	15
Spruce	Logs	77,896	15
Subalpine fir	Logs	12,577	13
		206,097	**15**

Transfer yard: Ospika dump

Aspen	Logs	94,851	18
Birch	Logs	25,960	18
Black spruce	Logs	7,667	18
Cottonwood	Logs	13,420	21
Pine	Logs	559,700	23
Spruce	Logs	265,666	24
Subalpine fir	Logs	55,608	23
		1,022,873	**22**

Transfer yard: Isola dump

Aspen	Logs	7,480	12
Birch	Logs	1,607	12
Black spruce	Logs	7,100	11
Cottonwood	Logs	131	13
Pine	Logs	131,764	13
Spruce	Logs	41,205	13
Subalpine fir	Logs	962	22
		190,248	**13**

Transfer yard: Deserters dump

Aspen	Logs	41,575	24
Birch	Logs	1,140	19
Black spruce	Logs	11,114	19
Cottonwood	Logs	5,430	16
Pine	Logs	384,250	20
Spruce	Logs	119,562	20
Subalpine fir	Logs	7,150	23
		570,221	**20**

Transfer yard: Factor Ross dump

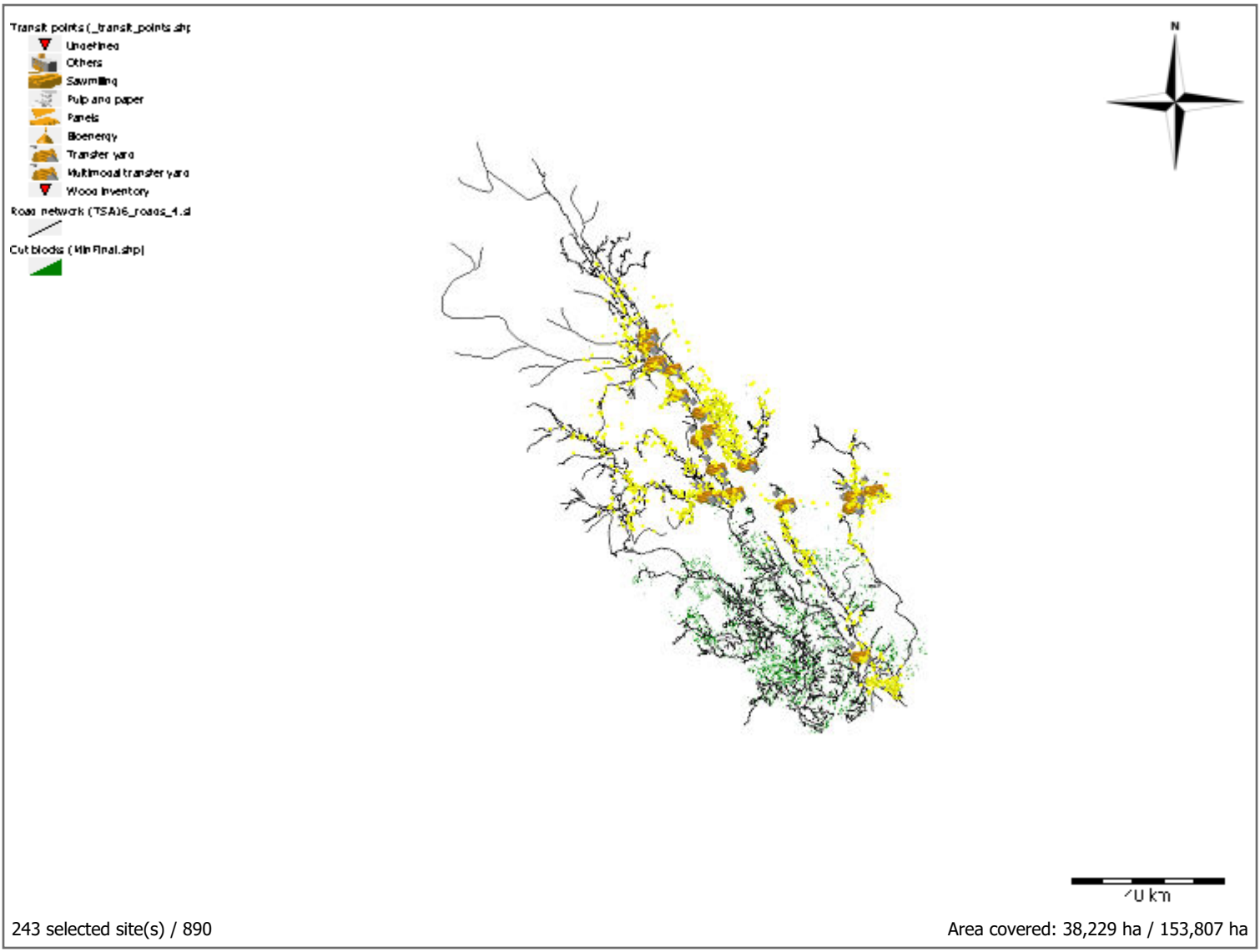
Aspen	Logs	12,869	6
Birch	Logs	2,949	8
Black spruce	Logs	808	9
Cottonwood	Logs	1,032	10
Pine	Logs	216,767	9
Spruce	Logs	80,916	10
Subalpine fir	Logs	7,727	9
		323,068	**9**

Transfer yard: Omineca dump

Aspen	Logs	23,675	23
Birch	Logs	389	7
Black spruce	Logs	4,278	52
Cottonwood	Logs	2,114	14
Pine	Logs	1,016,185	39
Spruce	Logs	264,141	36
Subalpine fir	Logs	38,626	38
		1,349,408	**38**

Transfer yard: Mackenzie mill

Aspen	Logs	104,416	42
Birch	Logs	18,605	45
Black spruce	Logs	3,755	15
Cottonwood	Logs	9,538	45
Pine	Logs	583,752	43
Spruce	Logs	246,195	51
Subalpine fir	Logs	33,489	53
		999,752	**45**
		9,075,682	**25**



243 selected site(s) / 890

Area covered: 38,229 ha / 153,807 ha

Products

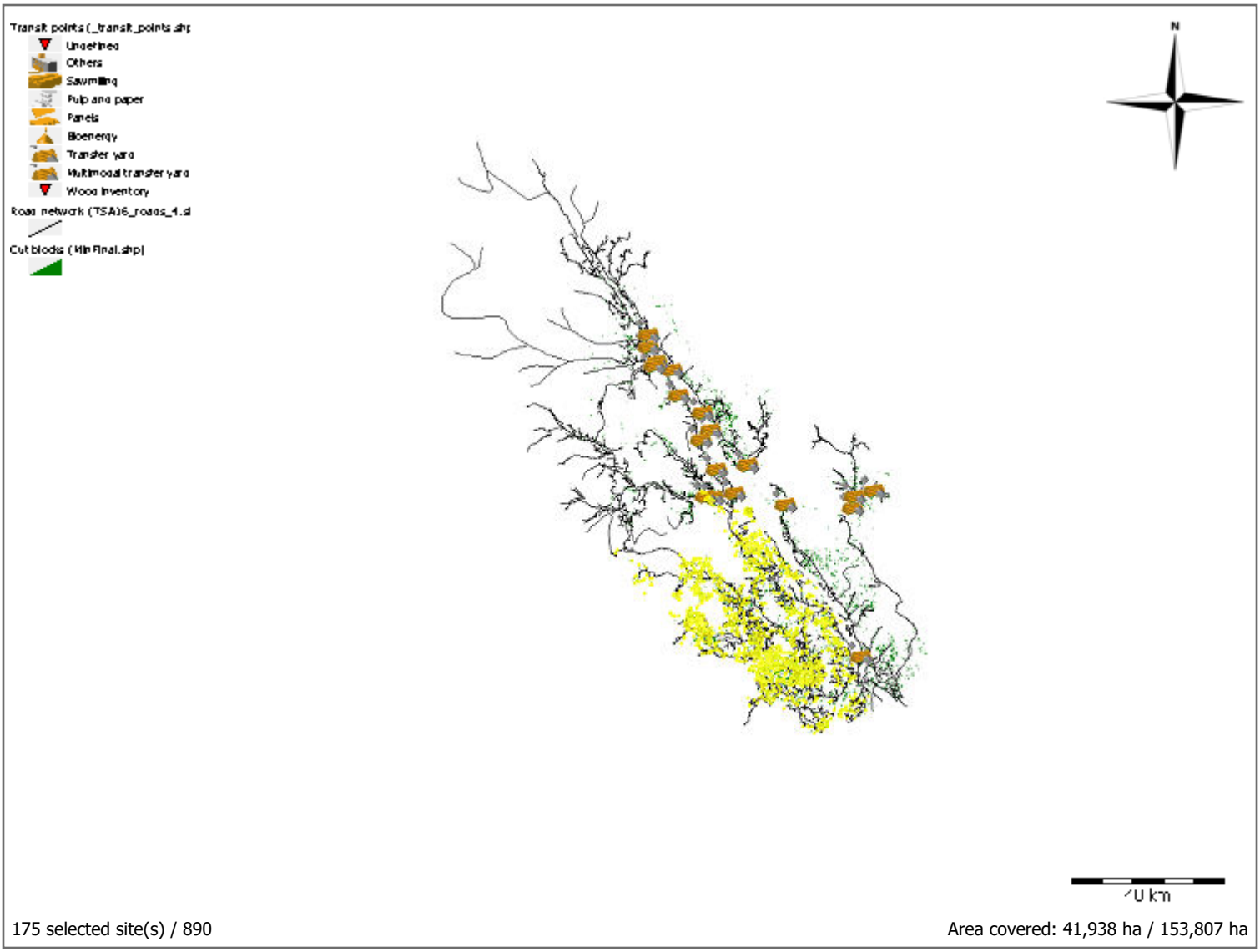
Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,600,548	133.5	0.270	54
Spruce	Logs	2,606,619	62.2	0.326	25
Pine-biomass	Logs	1,200,117	28.6	0.270	12
Subalpine fir	Logs	419,534	10.0	0.230	4
Aspen	Logs	353,253	8.4	0.188	3
Black spruce	Logs	77,016	1.8	0.177	1
Birch	Logs	22,128	0.5	0.212	0
Cottonwood	Logs	16,443	0.4	0.284	0
		10,295,658	**245.5**	**0.312**	**100**

Delivery to mills

Destination / Product	Format	m³	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen	Logs	70,373	101
Birch	Logs	1,741	66
Black spruce	Logs	27,560	108
Cottonwood	Logs	5,234	119
Pine	Logs	2,358,035	121
Spruce	Logs	1,199,546	122
Subalpine fir	Logs	187,809	117
		3,850,298	**121**
Transfer yard: Omineca dump			
Aspen	Logs	6,218	26
Birch	Logs	1,359	11
Black spruce	Logs	407	73
Cottonwood	Logs	7	68
Pine	Logs	188,598	12
Spruce	Logs	52,042	22
Subalpine fir	Logs	14,897	8
		263,529	**14**

Transfer yard: Mackenzie mill

	Aspen	Logs	276,662	67
	Birch	Logs	19,028	58
	Black spruce	Logs	49,049	89
	Cottonwood	Logs	11,201	69
	Pine	Logs	3,053,915	77
	Spruce	Logs	1,355,031	74
	Subalpine fir	Logs	216,828	76
			4,981,714	**76**
			9,095,541	**93**



175 selected site(s) / 890

Area covered: 41,938 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	37,209.4 ha
Number of cut blocks	309
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	37,209.4 ha
Harvesting system	
Full-tree with roadside processing	37,209.4 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.14 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.45 $/m³
Transportation	10.84 $/m³
Transfer yard	2.02 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**41.19 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-41.19 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Spruce	Logs	4,142,432	111.3	0.431	42
Subalpine fir	Logs	2,850,949	76.6	0.295	29
Pine	Logs	1,664,187	44.7	0.372	17
Aspen	Logs	642,963	17.3	0.285	6
Pine-biomass	Logs	356,611	9.6	0.372	4
Birch	Logs	124,154	3.3	0.309	1
Cottonwood	Logs	87,414	2.3	0.418	1
Black spruce	Logs	31,741	0.9	0.249	0
Douglas fir	Logs	413	0.0	0.899	0
		9,900,863	**266.1**	**0.370**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	35,020	0
	Birch	Logs	5,805	0
	Cottonwood	Logs	4,228	0
	Pine	Logs	30,231	0
	Spruce	Logs	62,467	0
	Subalpine fir	Logs	7,196	0
			144,947	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	35,343	88
	Birch	Logs	2,984	31
	Black spruce	Logs	8,967	112
	Cottonwood	Logs	1,742	90
	Pine	Logs	466,580	112
	Spruce	Logs	692,721	109
	Subalpine fir	Logs	226,324	108
			1,434,661	**109**

Transfer yard: Chunamon dump

Aspen	Logs	908	5
Cottonwood	Logs	1,174	5
Pine	Logs	2,446	5
Spruce	Logs	4,221	5
Subalpine fir	Logs	2,439	5
		11,188	**5**

Transfer yard: S Fort Grahame dump

Aspen	Logs	5,947	15
Birch	Logs	10,147	15
Black spruce	Logs	237	16
Cottonwood	Logs	73	22
Pine	Logs	36,753	17
Spruce	Logs	36,497	14
Subalpine fir	Logs	13,957	16
		103,610	**15**

Transfer yard: Fort Grahame dump

Aspen	Logs	1,697	16
Birch	Logs	260	9
Black spruce	Logs	129	18
Pine	Logs	6,885	10
Spruce	Logs	6,286	9
Subalpine fir	Logs	2,984	7
		18,241	**10**

Transfer yard: Chowika dump

Aspen	Logs	13,196	16
Birch	Logs	9,391	19
Black spruce	Logs	537	23
Cottonwood	Logs	1,709	19
Pine	Logs	32,330	19
Spruce	Logs	40,580	17
Subalpine fir	Logs	6,323	15
		104,066	**18**

Transfer yard: Swannell dump

Aspen	Logs	5,511	26
Birch	Logs	0	26
Pine	Logs	2,285	26
Spruce	Logs	453	26
		8,249	**26**

Transfer yard: Pete Toy dump

Spruce	Logs	13,791	16
Subalpine fir	Logs	19,429	16
		33,220	**16**

Transfer yard: Mesilinka dump

Aspen	Logs	1,334	37
Black spruce	Logs	18	30
Cottonwood	Logs	3,186	41
Pine	Logs	15,893	39
Spruce	Logs	61,265	31
Subalpine fir	Logs	11,893	26
		93,589	**32**

Transfer yard: E Bear Valley dump

Aspen	Logs	452	3
Birch	Logs	5	4
Cottonwood	Logs	51	4
Pine	Logs	3,795	4
Spruce	Logs	16,391	4
Subalpine fir	Logs	3,686	4
		24,380	**4**

Transfer yard: Finlay Forks dump

Aspen	Logs	67,247	17
Birch	Logs	8,616	27
Black spruce	Logs	24	31
Cottonwood	Logs	1,584	18
Pine	Logs	46,150	25
Spruce	Logs	191,950	26
Subalpine fir	Logs	143,007	27
		458,578	**25**

Transfer yard: Nabesche dump

Aspen	Logs	2,317	10
Birch	Logs	756	10
Cottonwood	Logs	244	10
Pine	Logs	5,499	10
Spruce	Logs	29,873	10
Subalpine fir	Logs	11,820	8
		50,509	**9**

Transfer yard: Bear Valley dump

Aspen	Logs	4,484	10
Birch	Logs	179	10
Black spruce	Logs	325	15
Cottonwood	Logs	370	14
Pine	Logs	18,484	13
Spruce	Logs	72,996	16
Subalpine fir	Logs	17,854	17
		114,692	**15**

Transfer yard: Ospika dump

Aspen	Logs	18,033	12
Birch	Logs	9,155	18
Black spruce	Logs	569	12
Cottonwood	Logs	2,409	13
Pine	Logs	25,233	15
Spruce	Logs	36,514	18
Subalpine fir	Logs	22,170	23
		114,082	**17**

Transfer yard: Isola dump

Aspen	Logs	168	19
Cottonwood	Logs	828	32
Pine	Logs	2,524	20
Spruce	Logs	5,654	31
Subalpine fir	Logs	2,259	19
		11,434	**26**

Transfer yard: Deserters dump

Aspen	Logs	1,366	22
Cottonwood	Logs	2,769	24
Pine	Logs	4,154	15
Spruce	Logs	2,615	21
		10,904	**20**

Transfer yard: Factor Ross dump

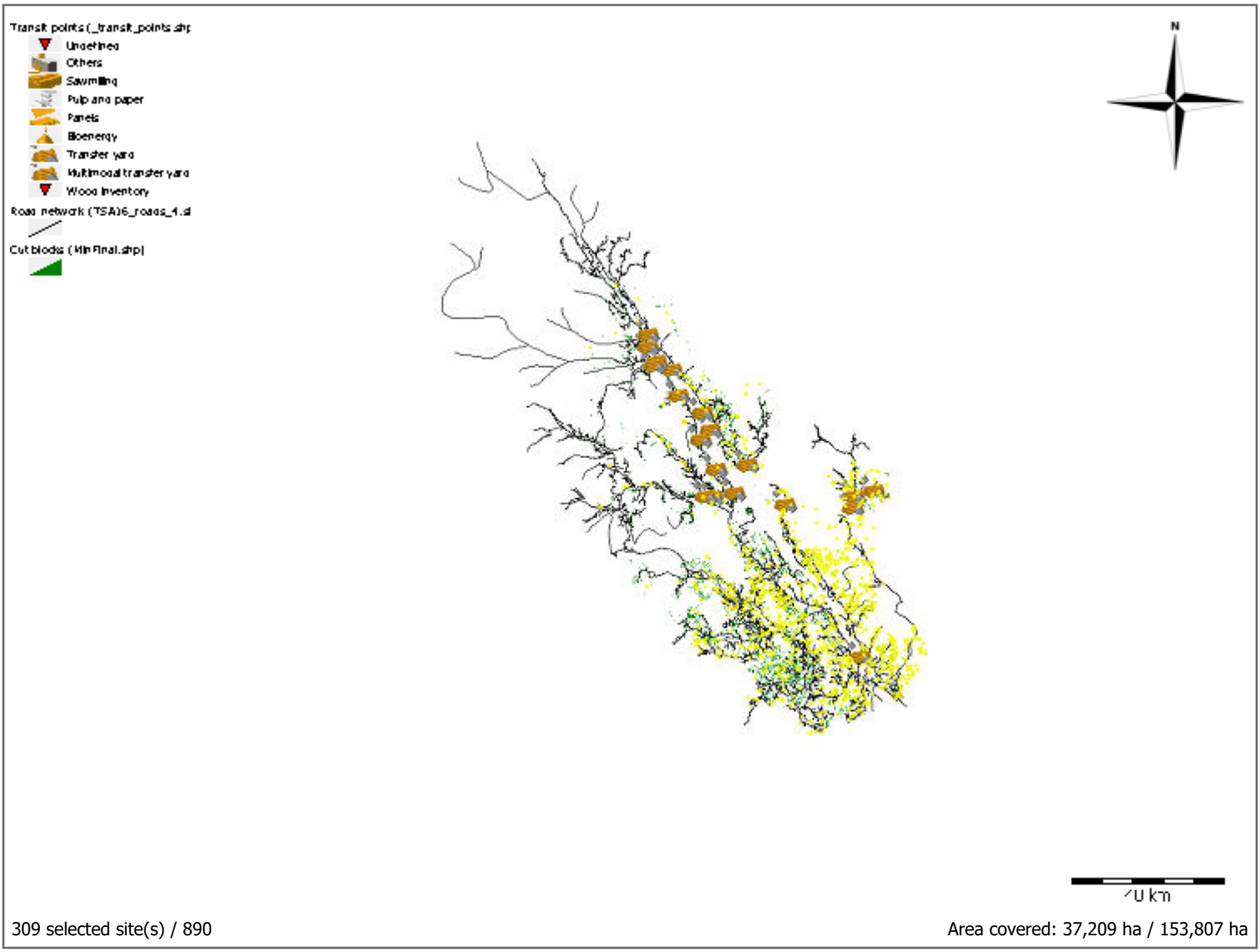
Aspen	Logs	1,052	9
Birch	Logs	2,440	7
Cottonwood	Logs	3	7
Pine	Logs	4,826	10
Spruce	Logs	6,650	11
Subalpine fir	Logs	655	12
		15,626	**10**

Transfer yard: Omineca dump

Aspen	Logs	1,984	31
Black spruce	Logs	689	36
Cottonwood	Logs	17	42
Pine	Logs	25,507	12
Spruce	Logs	45,939	33
Subalpine fir	Logs	16,509	23
		90,644	**25**

Transfer yard: Mackenzie mill

Aspen	Logs	446,903	41
Birch	Logs	74,416	43
Black spruce	Logs	20,247	68
Cottonwood	Logs	67,027	37
Douglas fir	Logs	413	29
Pine	Logs	934,612	68
Spruce	Logs	2,815,571	57
Subalpine fir	Logs	2,342,443	54
		6,701,632	**56**
		9,544,252	**59**



309 selected site(s) / 890

Area covered: 37,209 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	36,430.9 ha
Number of cut blocks	163
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	36,430.9 ha
Harvesting system	
Full-tree with roadside processing	36,430.9 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	28.01 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.77 $/m³
Transportation	14.86 $/m³
Transfer yard	2.93 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**47.31 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-47.31 $/m³

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	41,937.8 ha
Number of cut blocks	175
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	41,937.8 ha
Harvesting system	
Full-tree with roadside processing	41,937.8 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	28.68 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.77 $/m³
Transportation	15.31 $/m³
Transfer yard	3.17 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**48.68 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-48.68 $/m³

Products

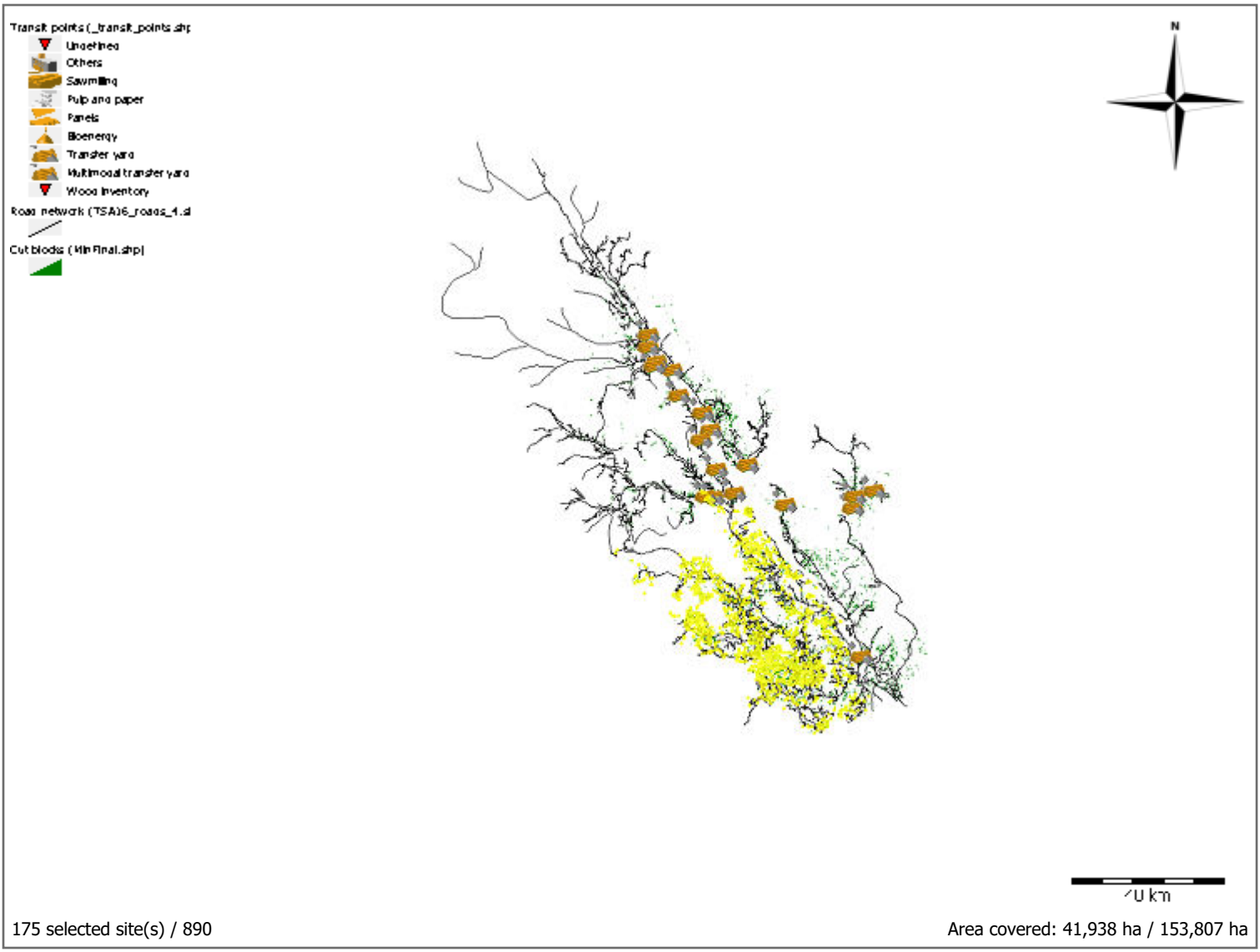
Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,600,548	133.5	0.270	54
Spruce	Logs	2,606,619	62.2	0.326	25
Pine-biomass	Logs	1,200,117	28.6	0.270	12
Subalpine fir	Logs	419,534	10.0	0.230	4
Aspen	Logs	353,253	8.4	0.188	3
Black spruce	Logs	77,016	1.8	0.177	1
Birch	Logs	22,128	0.5	0.212	0
Cottonwood	Logs	16,443	0.4	0.284	0
		10,295,658	**245.5**	**0.312**	**100**

Delivery to mills

Destination / Product	Format	m³	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen	Logs	70,373	101
Birch	Logs	1,741	66
Black spruce	Logs	27,560	108
Cottonwood	Logs	5,234	119
Pine	Logs	2,358,035	121
Spruce	Logs	1,199,546	122
Subalpine fir	Logs	187,809	117
		3,850,298	**121**
Transfer yard: Omineca dump			
Aspen	Logs	6,218	26
Birch	Logs	1,359	11
Black spruce	Logs	407	73
Cottonwood	Logs	7	68
Pine	Logs	188,598	12
Spruce	Logs	52,042	22
Subalpine fir	Logs	14,897	8
		263,529	**14**

Transfer yard: Mackenzie mill

	Aspen	Logs	276,662	67
	Birch	Logs	19,028	58
	Black spruce	Logs	49,049	89
	Cottonwood	Logs	11,201	69
	Pine	Logs	3,053,915	77
	Spruce	Logs	1,355,031	74
	Subalpine fir	Logs	216,828	76
			4,981,714	**76**
			9,095,541	**93**



175 selected site(s) / 890

Area covered: 41,938 ha / 153,807 ha

Products

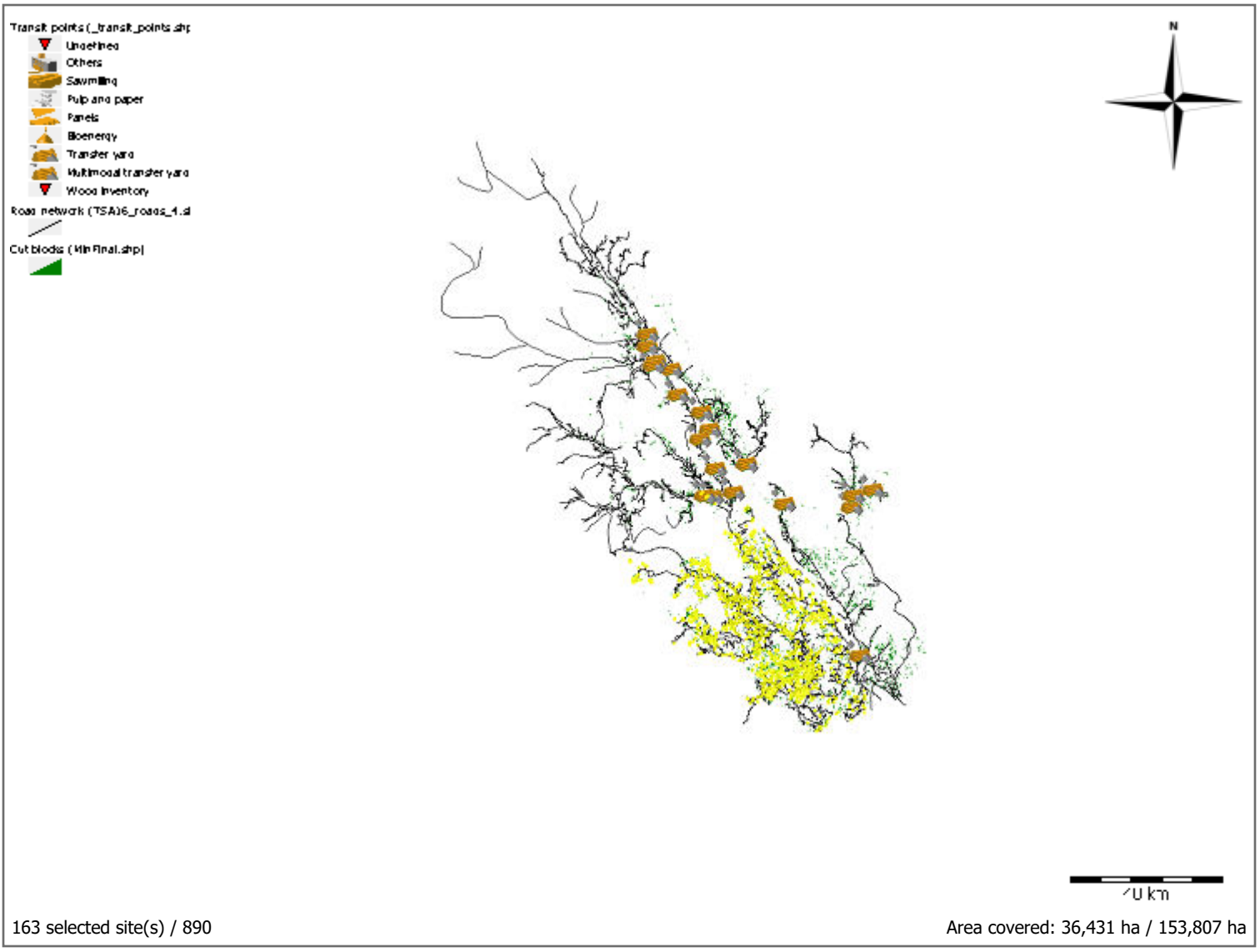
Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,625,272	154.4	0.304	57
Spruce	Logs	2,410,581	66.2	0.357	24
Pine-biomass	Logs	1,205,415	33.1	0.304	12
Subalpine fir	Logs	310,958	8.5	0.253	3
Aspen	Logs	251,771	6.9	0.196	3
Black spruce	Logs	61,661	1.7	0.191	1
Birch	Logs	21,820	0.6	0.279	0
Cottonwood	Logs	15,809	0.4	0.348	0
		9,903,288	**271.8**	**0.351**	**100**

Delivery to mills

Destination / Product	Format	m³	Transport average distance (Km)
Transfer yard: Raspberry dump			
Aspen	Logs	53,469	87
Birch	Logs	2,351	66
Black spruce	Logs	20,561	101
Cottonwood	Logs	4,134	87
Pine	Logs	2,261,194	115
Spruce	Logs	1,065,478	113
Subalpine fir	Logs	139,404	111
		3,546,593	**114**
Transfer yard: Omineca dump			
Aspen	Logs	1,581	6
Pine	Logs	67,071	5
Spruce	Logs	24,414	5
Subalpine fir	Logs	2,689	10
		95,755	**5**

Transfer yard: Mackenzie mill

	Aspen	Logs	196,721	71
	Birch	Logs	19,469	66
	Black spruce	Logs	41,100	79
	Cottonwood	Logs	11,675	70
	Pine	Logs	3,297,007	75
	Spruce	Logs	1,320,689	76
	Subalpine fir	Logs	168,864	77
			5,055,525	**75**
			8,697,872	**90**



163 selected site(s) / 890

Area covered: 36,431 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	38,229.2 ha
Number of cut blocks	243
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	38,229.2 ha
Harvesting system	
Full-tree with roadside processing	38,229.2 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.36 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.13 $/m³
Transportation	8.01 $/m³
Transfer yard	6.43 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**42.69 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-42.69 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Pine	Logs	5,835,008	152.6	0.361	57
Spruce	Logs	2,125,649	55.6	0.407	21
Pine-biomass	Logs	1,250,359	32.7	0.361	12
Aspen	Logs	567,001	14.8	0.231	5
Subalpine fir	Logs	324,417	8.5	0.262	3
Birch	Logs	111,555	2.9	0.274	1
Black spruce	Logs	62,713	1.6	0.226	1
Cottonwood	Logs	49,338	1.3	0.400	0
		10,326,041	**270.1**	**0.399**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	20,020	0
	Birch	Logs	2,560	0
	Cottonwood	Logs	1,849	0
	Pine	Logs	122,578	0
	Spruce	Logs	69,328	0
	Subalpine fir	Logs	8,148	0
			224,483	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	16,048	19
	Birch	Logs	4,839	8
	Black spruce	Logs	1,615	19
	Cottonwood	Logs	112	12
	Pine	Logs	197,614	10
	Spruce	Logs	35,893	9
	Subalpine fir	Logs	4,649	10
			260,771	**11**

Transfer yard: Chunamon dump

Aspen	Logs	9,948	16
Birch	Logs	2,796	22
Black spruce	Logs	3,071	15
Cottonwood	Logs	4,177	18
Pine	Logs	106,433	13
Spruce	Logs	31,763	14
Subalpine fir	Logs	5,505	10
		163,694	**14**

Transfer yard: S Fort Grahame dump

Aspen	Logs	63,448	14
Birch	Logs	13,972	13
Black spruce	Logs	4,844	16
Cottonwood	Logs	2,900	16
Pine	Logs	745,338	16
Spruce	Logs	310,011	17
Subalpine fir	Logs	75,888	19
		1,216,401	**16**

Transfer yard: Fort Grahame dump

Aspen	Logs	18,923	5
Birch	Logs	3,699	8
Black spruce	Logs	1,579	5
Cottonwood	Logs	693	7
Pine	Logs	165,718	9
Spruce	Logs	68,700	9
Subalpine fir	Logs	20,855	14
		280,167	**9**

Transfer yard: Chowika dump

Aspen	Logs	15,509	12
Birch	Logs	7,822	14
Black spruce	Logs	211	15
Cottonwood	Logs	1,322	12
Pine	Logs	156,733	16
Spruce	Logs	79,762	15
Subalpine fir	Logs	14,318	16
		275,677	**15**

Transfer yard: Ingenika dump

Aspen	Logs	2,628	26
Birch	Logs	1,030	26
Black spruce	Logs	8,478	25
Cottonwood	Logs	4	46
Pine	Logs	235,410	25
Spruce	Logs	44,009	27
Subalpine fir	Logs	1,785	23
		293,344	**26**

Transfer yard: Swannell dump

Aspen	Logs	8,659	28
Birch	Logs	303	19
Black spruce	Logs	2,379	51
Cottonwood	Logs	846	25
Pine	Logs	272,043	45
Spruce	Logs	67,677	42
Subalpine fir	Logs	3,656	52
		355,562	**44**

Transfer yard: Pete Toy dump

Aspen	Logs	1,831	8
Birch	Logs	2,907	8
Black spruce	Logs	1,306	8
Cottonwood	Logs	573	8
Pine	Logs	36,980	8
Spruce	Logs	15,882	8
Subalpine fir	Logs	1,311	8
		60,791	**8**

Transfer yard: Mesilinka dump

Aspen	Logs	18,334	18
Birch	Logs	2	7
Black spruce	Logs	2,022	50
Cottonwood	Logs	2,023	31
Pine	Logs	388,123	39
Spruce	Logs	116,892	37
Subalpine fir	Logs	15,383	33
		542,779	**38**

Transfer yard: E Bear Valley dump

Aspen	Logs	4,626	3
Birch	Logs	370	3
Cottonwood	Logs	89	3
Pine	Logs	21,025	3
Spruce	Logs	8,361	3
Subalpine fir	Logs	826	3
		35,298	**3**

Transfer yard: Finlay Forks dump

Aspen	Logs	83,164	26
Birch	Logs	19,488	31
Black spruce	Logs	1,073	33
Cottonwood	Logs	1,789	27
Pine	Logs	307,608	25
Spruce	Logs	127,130	27
Subalpine fir	Logs	9,972	20
		550,224	**26**

Transfer yard: Nabesche dump

Aspen	Logs	8,487	6
Birch	Logs	294	10
Cottonwood	Logs	1,098	1
Pine	Logs	84,304	8
Spruce	Logs	54,659	8
Subalpine fir	Logs	5,980	10
		154,822	**8**

Transfer yard: Bear Valley dump

Aspen	Logs	10,508	11
Birch	Logs	822	14
Black spruce	Logs	1,413	18
Cottonwood	Logs	199	8
Pine	Logs	102,682	15
Spruce	Logs	77,896	15
Subalpine fir	Logs	12,577	13
		206,097	**15**

Transfer yard: Ospika dump

Aspen	Logs	94,851	18
Birch	Logs	25,960	18
Black spruce	Logs	7,667	18
Cottonwood	Logs	13,420	21
Pine	Logs	559,700	23
Spruce	Logs	265,666	24
Subalpine fir	Logs	55,608	23
		1,022,873	**22**

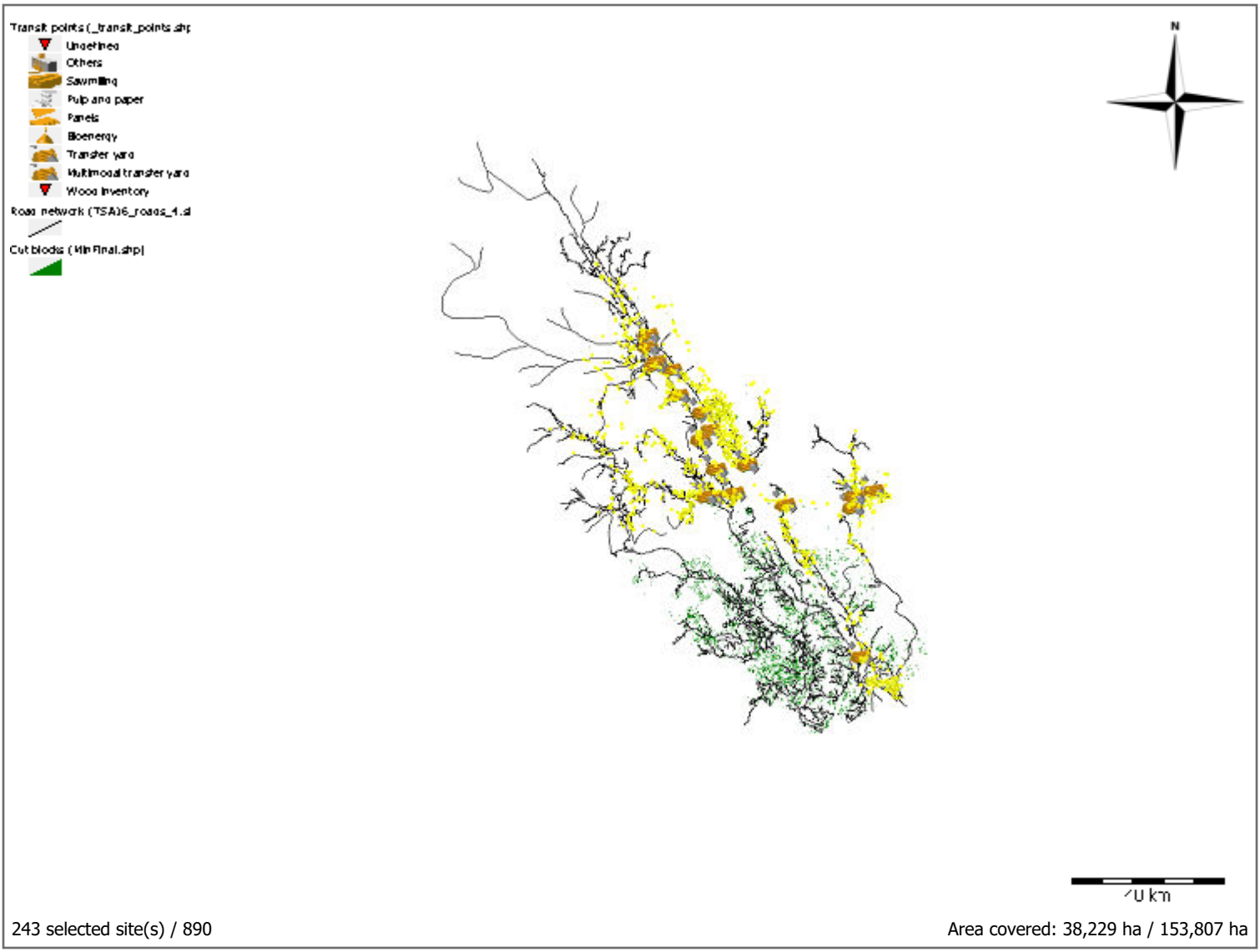
Transfer yard: Isola dump

Aspen	Logs	7,480	12
Birch	Logs	1,607	12
Black spruce	Logs	7,100	11
Cottonwood	Logs	131	13
Pine	Logs	131,764	13
Spruce	Logs	41,205	13
Subalpine fir	Logs	962	22
		190,248	**13**

Transfer yard: Deserters dump

Aspen	Logs	41,575	24
Birch	Logs	1,140	19
Black spruce	Logs	11,114	19
Cottonwood	Logs	5,430	16
Pine	Logs	384,250	20
Spruce	Logs	119,562	20
Subalpine fir	Logs	7,150	23
		570,221	**20**

Transfer yard: Factor Ross dump				
	Aspen	Logs	12,869	6
	Birch	Logs	2,949	8
	Black spruce	Logs	808	9
	Cottonwood	Logs	1,032	10
	Pine	Logs	216,767	9
	Spruce	Logs	80,916	10
	Subalpine fir	Logs	7,727	9
			323,068	**9**
Transfer yard: Omineca dump				
	Aspen	Logs	23,675	23
	Birch	Logs	389	7
	Black spruce	Logs	4,278	52
	Cottonwood	Logs	2,114	14
	Pine	Logs	1,016,185	39
	Spruce	Logs	264,141	36
	Subalpine fir	Logs	38,626	38
			1,349,408	**38**
Transfer yard: Mackenzie mill				
	Aspen	Logs	104,416	42
	Birch	Logs	18,605	45
	Black spruce	Logs	3,755	15
	Cottonwood	Logs	9,538	45
	Pine	Logs	583,752	43
	Spruce	Logs	246,195	51
	Subalpine fir	Logs	33,489	53
			999,752	**45**
			9,075,682	**25**



243 selected site(s) / 890

Area covered: 38,229 ha / 153,807 ha

Territory:	Unknown territory
Sector:	Unknown sector
Cut block:	<Multiple selection>

Cut blocks

Area	37,209.4 ha
Number of cut blocks	309
Average skidding dist.	250 m
Volume/km	0 m³/km
Area/km	0 ha/km
Cut type	
Clearcut	37,209.4 ha
Harvesting system	
Full-tree with roadside processing	37,209.4 ha

Terrain conditions

CPPA class	Ground strength (%)	Roughness (%)	Slope (%)
1	-	-	-
2	100	100	-
3	-	-	-
4	-	-	100
5	-	-	-

Costs

Harvesting	27.14 $/m³
Equipment transport	0.75 $/m³
Road network - Construction	0.00 $/m³
Road network - Repair	0.00 $/m³
Road network - Improvement	0.00 $/m³
Road network - Maintenance	0.45 $/m³
Transportation	10.84 $/m³
Transfer yard	2.02 $/m³
Stumpage fees	0.00 $/m³
Indirect costs	0.00 $/m³
Stand establishment	N/A
Total	**41.19 $/ m³**

Revenue

Value	0.00 $/m³
Reimbursements (silv.)	N/A

Net

Profit	-41.19 $/m³

Products

Name	Format	m³	m³ / ha	m³ / stem	% / total
Spruce	Logs	4,142,432	111.3	0.431	42
Subalpine fir	Logs	2,850,949	76.6	0.295	29
Pine	Logs	1,664,187	44.7	0.372	17
Aspen	Logs	642,963	17.3	0.285	6
Pine-biomass	Logs	356,611	9.6	0.372	4
Birch	Logs	124,154	3.3	0.309	1
Cottonwood	Logs	87,414	2.3	0.418	1
Black spruce	Logs	31,741	0.9	0.249	0
Douglas fir	Logs	413	0.0	0.899	0
		9,900,863	**266.1**	**0.370**	**100**

Delivery to mills

Destination	Product	Format	m³	Transport average distance (Km)
< Closest transfer yard>				
	Aspen	Logs	35,020	0
	Birch	Logs	5,805	0
	Cottonwood	Logs	4,228	0
	Pine	Logs	30,231	0
	Spruce	Logs	62,467	0
	Subalpine fir	Logs	7,196	0
			144,947	**0**
Transfer yard: Raspberry dump				
	Aspen	Logs	35,343	88
	Birch	Logs	2,984	31
	Black spruce	Logs	8,967	112
	Cottonwood	Logs	1,742	90
	Pine	Logs	466,580	112
	Spruce	Logs	692,721	109
	Subalpine fir	Logs	226,324	108
			1,434,661	**109**

Transfer yard: Chunamon dump

Aspen	Logs	908	5
Cottonwood	Logs	1,174	5
Pine	Logs	2,446	5
Spruce	Logs	4,221	5
Subalpine fir	Logs	2,439	5
		11,188	**5**

Transfer yard: S Fort Grahame dump

Aspen	Logs	5,947	15
Birch	Logs	10,147	15
Black spruce	Logs	237	16
Cottonwood	Logs	73	22
Pine	Logs	36,753	17
Spruce	Logs	36,497	14
Subalpine fir	Logs	13,957	16
		103,610	**15**

Transfer yard: Fort Grahame dump

Aspen	Logs	1,697	16
Birch	Logs	260	9
Black spruce	Logs	129	18
Pine	Logs	6,885	10
Spruce	Logs	6,286	9
Subalpine fir	Logs	2,984	7
		18,241	**10**

Transfer yard: Chowika dump

Aspen	Logs	13,196	16
Birch	Logs	9,391	19
Black spruce	Logs	537	23
Cottonwood	Logs	1,709	19
Pine	Logs	32,330	19
Spruce	Logs	40,580	17
Subalpine fir	Logs	6,323	15
		104,066	**18**

Transfer yard: Swannell dump

Aspen	Logs	5,511	26
Birch	Logs	0	26
Pine	Logs	2,285	26
Spruce	Logs	453	26
		8,249	**26**

Transfer yard: Pete Toy dump

Spruce	Logs	13,791	16
Subalpine fir	Logs	19,429	16
		33,220	**16**

Transfer yard: Mesilinka dump

Aspen	Logs	1,334	37
Black spruce	Logs	18	30
Cottonwood	Logs	3,186	41
Pine	Logs	15,893	39
Spruce	Logs	61,265	31
Subalpine fir	Logs	11,893	26
		93,589	**32**

Transfer yard: E Bear Valley dump

Aspen	Logs	452	3
Birch	Logs	5	4
Cottonwood	Logs	51	4
Pine	Logs	3,795	4
Spruce	Logs	16,391	4
Subalpine fir	Logs	3,686	4
		24,380	**4**

Transfer yard: Finlay Forks dump

Aspen	Logs	67,247	17
Birch	Logs	8,616	27
Black spruce	Logs	24	31
Cottonwood	Logs	1,584	18
Pine	Logs	46,150	25
Spruce	Logs	191,950	26
Subalpine fir	Logs	143,007	27
		458,578	**25**

Transfer yard: Nabesche dump

Aspen	Logs	2,317	10
Birch	Logs	756	10
Cottonwood	Logs	244	10
Pine	Logs	5,499	10
Spruce	Logs	29,873	10
Subalpine fir	Logs	11,820	8
		50,509	**9**

Transfer yard: Bear Valley dump

Aspen	Logs	4,484	10
Birch	Logs	179	10
Black spruce	Logs	325	15
Cottonwood	Logs	370	14
Pine	Logs	18,484	13
Spruce	Logs	72,996	16
Subalpine fir	Logs	17,854	17
		114,692	**15**

Transfer yard: Ospika dump

Aspen	Logs	18,033	12
Birch	Logs	9,155	18
Black spruce	Logs	569	12
Cottonwood	Logs	2,409	13
Pine	Logs	25,233	15
Spruce	Logs	36,514	18
Subalpine fir	Logs	22,170	23
		114,082	**17**

Transfer yard: Isola dump

Aspen	Logs	168	19
Cottonwood	Logs	828	32
Pine	Logs	2,524	20
Spruce	Logs	5,654	31
Subalpine fir	Logs	2,259	19
		11,434	**26**

Transfer yard: Deserters dump

Aspen	Logs	1,366	22
Cottonwood	Logs	2,769	24
Pine	Logs	4,154	15
Spruce	Logs	2,615	21
		10,904	**20**

Transfer yard: Factor Ross dump

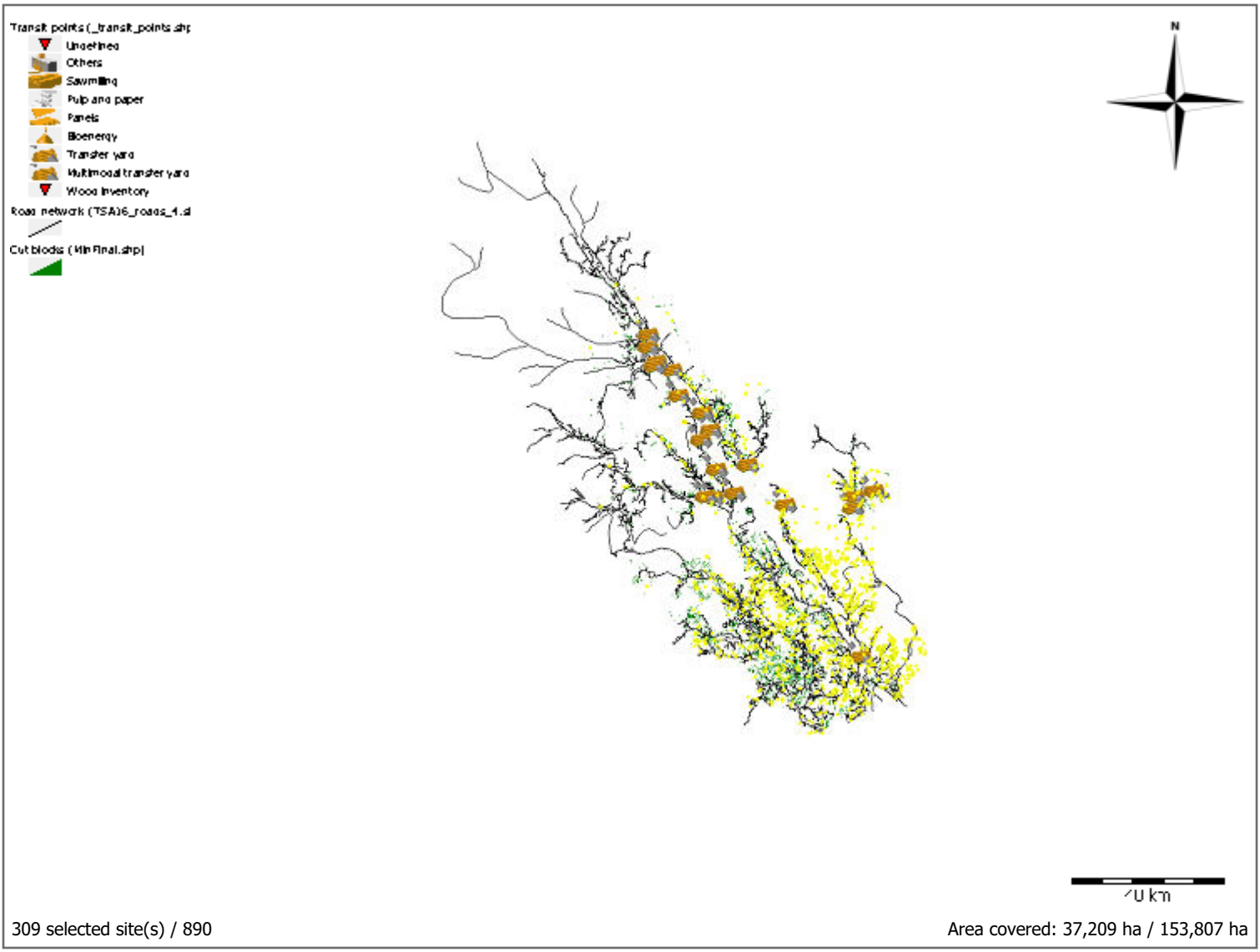
Aspen	Logs	1,052	9
Birch	Logs	2,440	7
Cottonwood	Logs	3	7
Pine	Logs	4,826	10
Spruce	Logs	6,650	11
Subalpine fir	Logs	655	12
		15,626	**10**

Transfer yard: Omineca dump

Aspen	Logs	1,984	31
Black spruce	Logs	689	36
Cottonwood	Logs	17	42
Pine	Logs	25,507	12
Spruce	Logs	45,939	33
Subalpine fir	Logs	16,509	23
		90,644	**25**

Transfer yard: Mackenzie mill

Aspen	Logs	446,903	41
Birch	Logs	74,416	43
Black spruce	Logs	20,247	68
Cottonwood	Logs	67,027	37
Douglas fir	Logs	413	29
Pine	Logs	934,612	68
Spruce	Logs	2,815,571	57
Subalpine fir	Logs	2,342,443	54
		6,701,632	**56**
		9,544,252	**59**



309 selected site(s) / 890

Area covered: 37,209 ha / 153,807 ha

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