21 FORESTRY

21.1 Approach

The Project's use of land has been assessed on the valued component (VC) of forestry, considering the Project interactions with the forest land base, with Crown forest land management, and with the forest industry.

21.1.1 Regulatory and Policy Setting

Crown forest regulation and management is the responsibility of the B.C. Ministry of Forests, Lands and Natural Resource Operations. The principal legal instruments are the *Forest Act* and the *Forest and Range Practices Act*.

The *Forest Act* identifies two broad categories of tenures for harvesting Crown timber: area-based tenures that give exclusive rights to harvest a specified annual volume of Crown timber from a defined area, which may comprise Crown and private lands, and volume-based tenures that entitle the holder to harvest a specified annual volume of Crown timber within a timber supply area (TSA).

The Chief Forester sets Annual Allowable Cuts (AACs), taking into consideration sustainable forest stewardship, a stable timber supply, and local social and economic objectives. Separate AACs are set for coniferous and deciduous leading stands and are typically reviewed every 10~~five~~ years.

Crown forest land is also managed for other forest uses and values. For example, certain biodiversity goals are realized by reserving old growth management areas (OGMAs). OGMAs are established by legal order pursuant to the *Land Act*. Land use objectives may be established under the *Forest and Range Practices Act*.

The conversion of Crown forest land base and timber harvesting land base to other land uses is common. Common exclusions include the establishment of protected areas, clearing for rights-of-way (roads, pipelines, transmission lines), and conversion to agriculture. The B.C. Ministry of Forests, Lands and Natural Resource Operations has policies and procedures to manage change and Crown obligations to tenure holders.

Forest management in the Project activity zone is guided by two higher level plans, the Dawson Creek Land and Resource Management Plan, and the Fort St. John Land and Resource Management Plan (B.C. Ministry of Forests, Lands and Natural Resource Operations 1999, 1997). A recommendation in both plans was the establishment of the Peace River Boudreau Lake proposed protected area under the *Environment and Land Use Act*. While the protected area has not been formally designated, government has minimized timber harvesting in the proposed area.

21.1.2 Key Issues and Identification of Potential Effects

Issues, concerns, and interests identified during consultation with the public, Aboriginal groups, and government agencies guided the scope of the forestry assessment (refer to Volume 1 Section 9 Information Distribution and Consultation). The key issues identified and the approaches used to address issues are outlined in Table 21.1.

Table 21.1 Key Issues: Forestry

Key Issues	Approach to Addressing Key Issues
How much timber harvesting land base that will be taken up by the Project, and what does that mean for the value of the Allowable Annual Cut?	▪ The most up-to-date estimates of the Crown Forest and timber harvesting land base are reported in this assessment. The potential implications to the Allowable Annual Cut are examined.
Will the merchantable wood volumes from Project clearing disrupt the local mill operations?	▪ Development of the Vegetation, Clearing, and Debris Management Plan (Volume 1 Appendix A) includes an inventory of milling capabilities and discussion about how the volume may be accommodated.
Will the old growth management areas taken up by the Project mean that biodiversity targets cannot be met?	▪ The matter was discussed with the responsible agency and the findings are reported in this assessment.
How does the Project fit within the context of current land use planning for Peace Forest District?	▪ The Dawson Creek and Fort St. John Land and Resource Management Plans were reviewed. Agency consultation updated the plans. The Project activity zone's overlap with the land and resource management plan resource management zones is identified, incorporating project effects on timber harvesting.
First Nations concern – potential effects of the Project on forest harvesting	▪ The potential implications to the Allowable Annual Cut and timber harvesting are examined in the forestry effects assessment.
First Nations concern – Access to valley bottom timber above the level of the reservoir may be enhanced or reduced by the reservoir	▪ The potential implications to the Allowable Annual Cut and timber harvesting are examined in the forestry effects assessment. There is a Vegetation, Clearing, and Debris Management Plan for the Project (Volume 1 Appendix A).

The Project would occupy Crown forest land, some of which is available for harvesting by industry and managed for timber harvesting over the long term. The forest stands would be harvested, but future forest crops would be foregone by the Project's occupation of the land. The Project would also remove merchantable timber that is deemed by the B.C. Ministry of Forests, Lands and Natural Resource Operations to be not available for harvest because of existing environmental and economic constraints. In the absence of the Project, this timber volume would not likely be harvested. Some of the lands not presently available for harvest are being managed to obtain other forest values, which would no longer be available for that purpose if the Project proceeds.

Potential project interactions with Forestry are summarized in Volume 2 Appendix A Project Interactions Matrix, Table 2. As defined in Volume 2 Section 10 Effects Assessment Methodology, a rank of "2" was given where interactions may result in an adverse effect and the nature of the effect and/or the effectiveness of mitigation measures is uncertain. These interactions were taken forward through the effects assessment.

Project interactions with a ranking of "2" are set out in Table 21.2 below. As seen in the table below, none of the project activities and physical works had an interaction with Crown forest management that warranted a "2" ranking.

Table 21.2 Interactions of the Project With Forestry

Project Activities and Physical Works	Key Aspects	
	Change in Land Use, Resource Use, Access and Activities Related to Industrial Forestry Use	Crown Forest Management
Construction		
Dam and Generating Station Construction	✓	N/A
Reservoir Preparation and Filling	✓	N/A
Transmission System	✓	N/A
Quarried and Excavated Material Source Development	✓	N/A
Highway 29 Realignment	✓	N/A
Construction Access Road Development	✓	N/A

NOTE:
Only Project interactions ranked as "2" in Volume 2 Appendix A Project Interaction Matrix, Table 2 are carried forward to this table. A ✓ indicates that a project component or activity is likely to interact with forestry
N/A – not applicable

21.1.3 Standard Mitigation Measures and Effects Addressed

A ranking of "0" in Volume 2 Appendix A Project Interactions Matrix, Table 2 indicates that there is no potential interaction between the Project activity and the VC. For the Project operations phase, new or incremental effects are not anticipated and a "0" is assigned to the interaction.

A "1" ranking was given where an adverse effect may result from an interaction, but standard mitigation measures to avoid or minimize the potential effects are available and are well understood to be effective, and any residual effect is negligible. These interactions were not carried forward through the effects assessment.

A "1" ranking was applied to the southern and northern regional temporary accommodation activities of worker accommodation because, while there may be spatial overlaps with forestry, the tenures necessary to construct and operate them will be part of the Project's overall tenuring processing and related mitigation, as outlined in Volume 2 Section 11.3 Land Status, Tenure, and Project Requirements.

A "1" ranking was also assigned to transportation of construction materials and supplies at the dam site, transportation of merchantable timber away from the reservoir, and West Pine quarry access. BC Hydro will prepare a Traffic Management Plan for the Project's construction phase that will include applicable access restrictions and traffic control along roads and railway corridors. Where appropriate, the Project will enter into road use agreements. These actions are standard, and would address potential transportation conflicts between the Project and industrial forest use. In the long term, road upgrades could also benefit industrial forest users.

The Project activity zone overlap of the four OGMAs consists of two less than 40 ha and two in excess of 40 ha as described in Table 21.3. It was indicated that larger overlaps would be accommodated within the two affected TSAs (Ministry of Forests, Lands and Natural Resource Operations, Land and Resource Specialist 2011, 2012, pers. comm.). As the government has standard procedures for managing OGMA overlaps, there are no

expected residual adverse effects on forest management attributable to the Project. This aspect of the Project's effect on forestry is not addressed further.

Table 21.3 Old Growth Management Areas in the Project Activity Zone and Reservoir Impact Lines

OGMA Identifier	Five-Year Beach Line[a]	Site C Dam Site Area[b]	Transmission Line[c]	Construction Access Roads[d]	Quarried & Excavated Materials[e]	Total Size	% Reduction
	ha						
FSJ_DC_lmo_07	0	0	0	4.7	0	1,480.0	0.3
FSJ_DC_lmo_12	0	0	65.1	2.4	0	1,337.3	5.1
FSJ_DC_lmo_13	0	0	36.9	0	0	876.7	4.2
FSJ_DC_pbo_13	1,458.2	47.4	0	20.7	0	14,564.7	28.8

NOTES:

[a] Five-year Beach Line is the predicted extent of shoreline retreat at the maximum normal reservoir level five years after impoundment of the proposed reservoir as defined in Volume 2 Appendix B Geology, Terrain Stability, and Soil Reports, Part 2 Preliminary Reservoir Impact Lines

[b] Site C dam site and substation construction areas and restricted access zones as described in Volume 1 Section 4 Project Description

[c] Transmission line corridor and one-time clearing areas as described in Volume 1 Section 4 Project Description

[d] Permanent and temporary roads, Highway 29 realignment as described in Volume 1 Section 4 Project Description

[e] Off-site construction material sources as described in Volume 1 Section 4 Project Description

Source: Hillcrest Geographics (2012)

Forest development activities (e.g., road development, cutblock application) that may be proposed for lands adjacent to the reservoir that have the potential to be affected by the Project. These lands are discussed in Volume 2 Appendix B Geology, Terrain, and Soil Reports, Part 2 Preliminary Reservoir Impact Lines.

There may be potential effects related to flooding, erosion, instability, and landslide-generated waves on these lands. BC Hydro would notify the applicant of the nature of the particular effect when contacted through the established referral process managed by the B.C. Ministry of Forest, Lands and Natural Resource Operations.

21.1.4 Selection of Key Indicators

Key indicators listed in the EIS Guidelines for the forestry VC are standard measures associated with the forest land base, and measures that indicate the potential effects on industry activity. A key indicator for addressing project changes to the timber supply of the forest industry is the timber harvesting land base. The timber harvesting land base is defined as:

> "Crown forest land within the timber supply area where timber harvesting is considered both acceptable and economically feasible, given objectives for all relevant forest values, existing timber quality, market values, and applicable technology." (BCMFR 2008)

The allowable annual cut is the rate of timber harvest permitted each year in a management unit, as determined by the Chief Forester. The volume (m^3/y) is apportioned among timber tenures for the harvest of timber in the management unit. Site

index is a measure of a site's tree growing potential and is embedded in the AAC determination; hence, it is not reported as a separate indicator.

The timing and volume of the merchantable timber harvested from the Project activity zone, forest sector employment, and B.C. government stumpage revenue are the key indicators for characterizing the potential effects of the Project on the VC, forestry.

Key indicators are summarized in Table 21.4.

Table 21.4 Key Indicators for Forestry

Key Aspects	Key Indicators	Rationale for the Key Indicators
Change in Land Use, Resource Use, Access and Activities Related to Industrial Forestry Use	Timber harvesting land base (ha)	Timber harvesting land base is the Crown land area where timber harvesting is considered both acceptable and economically feasible
	Site productivity	Measures the relative tree growing potential of the land
	AAC (m3)	Is the annual volume of timber that can be made available for harvest to holders of Crown forest tenures
	Inventory of timber in the project clearing plan (m3)	This measures the merchantable volume generated from Project clearing activities available for forest industry use
	Harvest trends (m3)	Provides context for Project's contribution to regional timber production and industry capability
	Forest Sector Employment (person-year, PY)	Employment is a desirable economic outcome
	B.C. Government stumpage revenue ($)	Payment by the licensee to the resource owner

21.1.5 Spatial and Temporal Boundaries

21.1.5.1 Spatial Boundaries

The Local Assessment Area (LAA) in the EIS Guidelines for the assessment of the VC of forestry is the Project activity zone. The Regional Assessment Area (RAA) in the EIS Guidelines is composed of three forest management units including: Dawson Creek TSA, Fort St. John TSA, and Peace River supply block of Tree Farm Licence (TFL) 48.

The areas used for reporting in this assessment were updated from the originally proposed spatial boundaries in the EIS Guidelines. The LAA selected for forestry is the Project activity zone and the area within the Five-Year Beach Line, which includes all areas from which trees would be removed prior to inundation, access to the timber harvesting land base would be curtailed, and forest management potentially altered. The Five-Year Beach Line is the predicted extent of shoreline retreat at the Maximum Normal Reservoir Level approximately five years after impoundment of the proposed reservoir as defined in Volume 2 Appendix B Geology, Terrain Stability, and Soil Reports, Part 2 Preliminary Reservoir Impact Lines.

The Regional Assessment Area (RAA) is the area within which other Projects are identified, whose project effects could interact with effects on forestry from the Project, causing measurable cumulative effects. The RAA is composed of three forest management units:

- Dawson Creek TSA
- Fort St. John TSA
- Peace River supply block of Tree Farm Licence (TFL) 48

The spatial boundaries are described in Table 21.5 and shown in Figure 21.1.

Table 21.5 Spatial Assessment Area for Forestry

Local Assessment Area	Regional Assessment Area
Project activity zone and area within 5-Year Beach Line	Dawson Creek TSA, Fort St. John TSA, Peace River supply block of TFL 48

21.1.5.2 Temporal Boundaries

The potential effects of the Project on forestry are assessed for the construction phase of the Project, as this is the phase that forestry would be displaced as a land use in the Project activity zone and when merchantable timber from clearing activities would be available. Site reclamation activities would occur in temporary use areas, by the end of the construction phase. There would be no incremental adverse effects to Forestry during operations.

21.2 Information Sources and Methodology

21.2.1 Literature Review

The two main forest management units within the Project activity zone, the Dawson Creek and Fort St. John timber supply areas, are subject to timber supply reviews, which were reviewed for information on the forest resource and socio-economic conditions.

The Dawson Creek and Fort St. John Land and Resource Management Plans (B.C. Ministry of Forests, Lands and Natural Resource Operations 1997 and 1999, respectively) were reviewed to understand where and how industrial timber harvesting would likely occur in the future.

The Vegetation, Clearing, and Debris Management Plan (Volume 1 Appendix A) was reviewed to understand the standing inventory within Project activity zone, and the proposed timing and volume of merchantable timber to be removed from the Project activity zone. Background reports supporting the Vegetation, Clearing, and Debris Management Plan provided information on the potentially affected industry (IFS 2012).

21.2.2 Interviews

Interviews were held with B.C. Ministry of Forests, Lands and Natural Resource Operations staff related to the timber supply review documents, with a focus on baseline data, trends, investment plans, and how project effects would be managed through existing policies and practices. Volume 3 Appendix C Land and Resource Use Assessment Supporting Documentation, Part 1 Land and Resource Use Assessment Interview Methodology provides details on the interview methodology. Personal communications are noted at the end of this section.

21.2.3 Field Investigations

No fieldwork was undertaken for this assessment.

21.2.4 Data Management, Mapping, and Modelling

Data sources included the B.C. government land and resource data warehouse and the Vegetation, Clearing, and Debris Management Plan (Volume 1 Appendix A).

21.2.5 Aboriginal Community and Traditional Knowledge

Aboriginal traditional and community knowledge related to the forestry VC was obtained through results of BC Hydro's consultation with Aboriginal groups and of First Nations community baseline studies prepared by the following First Nations located in the RAA: Doig River First Nation, Halfway River First Nation, Prophet River First Nation, and West Moberly First Nations. While the communities and traditional territories of the Blueberry First Nations, McLeod Lake Indian Band, and Saulteau First Nations are also in or near the boundaries of the RAA, BC Hydro had not received community baseline information from them at the time of writing.

Baseline information and data as well as First Nations concerns and interests relevant to forestry are incorporated in the baseline and effects assessment sections below. The First Nations community baseline reports are provided in Volume 3 Appendix B First Nations Community Baseline Reports, Part 7 Integration of Community Baseline Profiles into EIS: Integration Summary Table Doig River First Nation, Halfway River First Nation, Prophet River First Nation, West Moberly First Nations.

BC Hydro's approach to gathering community-based social and economic data with First Nations is described in Volume 3 Appendix B First Nations Community Baseline Reports, Part 1 Approach to Gathering and Integrating Community Baseline Information.

21.3 Baseline Conditions

21.3.1 Overview

The forest industry makes an important contribution to the northeast B.C. economy. It supports employment in timber harvesting and wood manufacturing, ranking behind the region's oil and gas, mining and construction industries (B.C. Ministry of Citizens' Services and Open Government 2012). The AAC of the two TSAs in the LAA is 3.97 million m^3, or 5.1% of the provincial AAC (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012a). The AAC includes harvest of coniferous and deciduous stands.

The Project activity zone is within the Fort St. John and Dawson Creek Land and Resource Management Plan areas. These plans were developed in the 1990s by a multi-stakeholder consultative process and accepted by government. Each plan has defined resource management zones with specified management objectives and strategies. The objectives and strategies provide management direction to Crown land/resource managers, including rate of timber harvest and limitations on timber harvesting. The Project activity zone overlaps several resource management zones, including the recommended Peace River Boudreau Lake proposed protected area. The area of overlap by resource management zone is summarized in Volume 3 Appendix C

Land and Resource Use Assessment Supporting Documentation. Although the protected area has not been proclaimed, the B.C. Ministry of Forests, Lands and Natural Resource Operations has not been approving applications for timber harvesting in the designated area.

21.3.2 Forest Management Units and Timber Harvesting Land Base and Site Productivity

The Project activity zone overlaps three forest management units; the Fort St. John and Dawson Creek TSAs, and TFL 48. Table 21.6 summarizes the total land area and the timber harvesting land base (THLB) of the three management units. The Fort St. John TSA is the larger of the two TSAs, covering 4.7 million ha, as compared to 2.3 million ha in the Dawson Creek TSA. The THLB varies among the management units as a proportion of the total land base. It comprises 32% of the Dawson Creek TSA, 14% of the Fort St. John TSA, and 57% of TFL 48.

The northern boundary of the Dawson Creek TSA is the south shore of the Peace River before crossing to the north shore near Hudson's Hope. The Fort St. John TSA is bounded by the Peace River and the Dawson Creek TSA in the south. TFL 48 (also known as the Chetwynd TFL) covers 643,000 ha. It consists of five discrete supply blocks, one of which is located south of the Peace River, across from Farrell Creek.

Table 21.6 Timber Harvesting Land Base and Allowable Annual Cut for Management Units

Management Unit	Total Land Area	Leading Species	THLB in Management Unit (ha)
Dawson Creek TSA	2,300,000	Coniferous	469,878
		Deciduous	260,342
Fort St. John TSA	4,700,000	Coniferous	733,221
		Deciduous	325,318
TFL 48	643,000	Coniferous	314,829
		Deciduous	48,539
Totals	**7,643,000**	**N/A**	**2,152,127**

NOTE:
THLB – timber harvesting land base
N/A – not applicable
Sources: BCMFR (2003a, 2003b, 2007a)

Site productivity is an index of the land's tree growing potential as measured by the height of the tallest trees in a stand at 50 years, expressed as an index. In the Project activity zone, site productivity has been assessed on 15,708 ha, with 0.1% identified as having high growth potential, 67% medium potential and 33% poor (Hillcrest Geographics 2012).

21.3.3 Annual Allowable Cut and Timber Harvest Trends

The current AAC for each of the management units in the region is shown in Table 21.7. It is set separately for coniferous and deciduous leading stands. The next AAC determination for the Dawson Creek TSA is scheduled for release in 2012, in 2013 for

the Fort St. John TSA, and in 2017 for TFL 48 (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012b).

Table 21.7 Allowable Annual Cut for Management Units

Management Unit (MU)	Leading Species	AAC (m^3)
Dawson Creek TSA	Coniferous	978,000
	Deciduous	882,000
Fort St. John TSA	Coniferous	1,200,000
	Deciduous	915,000
TFL 48	Coniferous	800,000
	Deciduous	100,000
Totals		**4,875,000**

NOTE:
Sources: BCMFR (2003a) (2003b) (2007b)

The timber harvest volume between 2003 and 2011 (including non-AAC volume such as private timber) is presented in Figure 21.2. The total harvest available for wood manufacturing has varied widely over the period, climbing to a peak in 2007 at 4.3 million m^3 and then falling by approximately 50% to about 2.2 million m^3 in 2009. The increased harvest in the Fort St. John TSA after 2006 is attributed to increases in the harvest of aspen with the opening of the oriented strand board mill in Fort St. John. The sharp drop in harvest levels precipitated by the recession in 2008 and 2009 had only partially rebounded by 2011. The average annual harvest volume over the 2003 and 2011 period was 3.363 million m^3 per year. It is noted that the total harvest was less than the AAC throughout this period.

From 2003 to 2011, timber volume from private land averaged about 11% of the total harvest volume in the region. The balance of the volume was harvest from provincial Crown land.

Timber harvesting activity in the region is seasonal, with harvest sharply curtailing during April and May when ground conditions are not suitable (Figure 21.3). Harvest more closely matches processing requirements in the summer and early fall. From November to the end of March, harvest volumes peak as mills stockpile logs to satisfy their log input year-round.

21.3.4 Employment and Stumpage Revenue

Direct employment in harvesting and manufacturing of timber from the management units has been an estimated 2,250 person-years of employment per year, given the harvest volume averaged over the period 2003 to 2011 (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012). Employment coefficients (direct employment including harvesting, silviculture, and processing) for Fort St. John TSA are estimated at 0.67 person-years; Dawson Creek TSA (and TFL 48) are estimated at 0.71 person-years in total.

Stumpage revenue paid by industry to the provincial government has varied from a high of $46.5 million in 2005 to a low of $3.4 million in 2011. The stumpage rate averaged $5.77 per m^3 over the period 2003 to 2011 (B.C. Ministry of Forests, Lands and Natural Resource Operations 2011).

21.3.5 Major Tenure Holders and Regional Timber Manufacturing Industry

Timber manufacturing capacity in the region is summarized in Table 21.8. Approximately two-thirds of the total harvest is linked directly to licensees' mill operations. The remaining one-third is distributed to the region's mills through market arrangements. Mills adjust their log sources to minimize log costs and adapt to market conditions, including third-party supply and timber harvested from their own licences.

The four major tenure holders with mill operations in the region are West Fraser Timber, Canadian Forest Products (Canfor), Tembec, and Louisiana Pacific (IFS 2012):

- West Fraser operates a sawmill in Chetwynd, the input log capacity is estimated at 750,000 m^3 (coniferous) per year. The company holds a renewable forest licence (volume based) in the Dawson Creek TSA, with an annual allowable harvest of 371,567 m^3. The mill's operating area for harvesting Crown timber is west and south of Chetwynd. It also purchases a large volume of wood from private landowners, the oil and gas industry, community forests, and timber awarded under the B.C. Timber Sales program. The Chetwynd mill is planning to increase its processing capacity to 1.1 million m^3 per year and to add a bioenergy plant that would burn wood waste and produce electricity.
- Canfor manufactures the largest wood volume in the region. The company operates a sawmill in Chetwynd with an annual log input capacity of 900,000 m^3. The mill obtains most of its wood supply from Tree Farm 48. The TFL's annual available volume is 900,000 m^3, of which 678,782 m^3 is apportioned to Canfor, and the remainder to B.C. Timber Sales and other licences. A small portion of the TFL is in the Project activity zone. The mill also purchases wood from private landowners, the oil and gas industry, community forests, and timber awarded under B.C. Timber Sales program.

In the Fort St. John TSA, Canfor operates a sawmill in Fort St. John, a pulp mill in Taylor, and the Peace Valley OSB (oriented strand board) mill in partnership with Louisiana Pacific in Fort St. John. The sawmill, with an input capacity of 1,062,000 m^3, obtains its wood supply from north of the Peace River, about half from its own Crown forest licences, and the remainder through purchases from private landowners, the oil and gas industry, and timber awarded under B.C. Timber Sales program. A substantial portion of the log volume heading to the Fort St. John mill moves down the Farrell Creek road and Highway 29. The pulp mill in Taylor relies on residual chips from the sawmill and deciduous wood supply. At capacity production, the oriented strand board mill consumes 1 million m^3 of deciduous logs per year. About 50% of the volume is supplied through the joint venture's pulp wood agreement. The remainder is purchased from private landowners, participants in the B.C. Timber Sales program, the oil and gas industry, and its own tenures.

- Louisiana-Pacific owns an oriented strand board plant in Dawson Creek that is closed pending an improvement in market conditions (*Dawson Creek Daily News* 2011). When operating, the plant consumes about 600,000 m^3 of deciduous logs that are sourced from its Crown licence (pulp wood agreement), purchases of Crown wood, and from private landowners. The plant targets aspen species and obtains a portion of its log supply from the area south of the Peace River (Del Rio area). The company also holds Crown forest licences for deciduous leading stands in the Fort St. John TSA totalling 193,000 m^3.

- Tembec Industries (Tembec) owns a pulp mill near Chetwynd that closed indefinitely in 2012 (*Vancouver Sun* 2012). When operating, the mill consumed about 500,000 m^3 of deciduous logs harvested from its Crown licence in the Dawson Creek TSA and through a supply agreement with Louisiana-Pacific. About 15% of the mill's supply was purchased from private landowners, B.C. Timber Sales operators, and others. An important log supply area is south of the Peace River.

Table 21.8 Major Tenure Holders, Annual Allowable Cut Volumes and Wood Processing Plants

Major Tenure Holders	Management Unit	Annual Crown Licensed Volume (m3) [a]	Wood Processing Plants	Species Utilized [b]	Annual Log Input at Full Capacity (m^3) [c]
West Fraser	Dawson Creek	371,567	Sawmill, Chetwynd	C	750,000
Canfor	Dawson Creek	100,000	Sawmill, Chetwynd	C	2,962,000
	TFL 48	678,782 (Canfor's portion)	N/A	N/A	NA
	Fort St. John	1,044,952 (500,000 (deciduous))	Sawmill, Fort St. John; OSB plant, Fort St. John; pulp mill, Taylor	C, D, residual chips	NA
Louisiana-Pacific	Dawson Creek	445,585 (deciduous)	OSB plant, Dawson Creek [d]	D	600,000
	Fort St. John	193,000 (deciduous)	N/A	N/A	N/A
Tembec Industries Ltd.	Dawson Creek	349,584 (deciduous)	Pulp mill, Chetwynd [d]	D	500,000
	Fort St. John	69,085 (18,000 decidious)	N/A	N/A	N/A
B.C. Timber Sales	Dawson Creek	401,186 (81,000 decidious)	N/A	N/A	N/A
	Fort St. John	622,059 (180,000 deciduous)	N/A	N/A	N/A
	TFL 48	58,630	N/A	N/A	N/A
Woodlots	Dawson Creek	32,600	N/A	N/A	N/A
	Fort St. John	36,500	N/A	N/A	N/A
Community Forest	Dawson Creek	60,000	N/A	N/A	N/A
	Fort St. John	20,000	N/A	N/A	N/A
Total in Management Units		4,483,5305, ~~180,312~~	**Total log input at full capacity of wood processing plants**		4,812,0005, ~~177,000~~

NOTES:

[a] B.C. Ministry of Forests, Lands and Natural Resource Operations 2011. Coniferous volume unless otherwise noted.

[b] C – coniferous D - deciduous

[c] IFS 2012

[d] Operations idled at time of writing

NA – data not available

West Moberly First Nations is a joint venture partner with Canfor in two non-replaceable forest licences; Non-Replaceable Forest Licence A57332 with an AAC of 100,000 m^3 over a 20-year term in the Dawson Creek TSA and Non-Replaceable Forest Licence A56771 with an AAC of 250,000 m^3 over a 20-year term in the Fort St. John TSA. Dunne-za Ventures LP, wholly owned by West Moberly First Nations, has an agreement with ProAction Corp. to provide timber tenure and development services in the Peace region. The company has undertaken forestry contract services for several companies, including Canfor, Peace Valley OSB, and Louisiana-Pacific (Dunne-za Ventures LP 2012).

Saulteau First Nations owned 4 Evergreen Resources LP undertakes full scale logging under contract, as well as road building and excavation-related services (4 Evergreen Resources LP No date).

B.C. Timber Sales offices in Dawson Creek and Fort St. John are responsible for managing a portion of the Crown forest and making its apportioned wood volume available for auction. The allocations are 400,000 m^3 in the Dawson Creek TSA and 620,000 m^3 in the Fort St. John TSA. Part of this harvest is undertaken by small processors and logging contractors that sell the logs to mills in the region.

Each mill establishes an input log profile that matches its production requirements, specifying species, diameter, length, and quality. Logs are sorted based on these criteria prior to hauling. Due to the preponderance of mixed stands in the region, logs are actively traded among mills and companies to optimize desired log profiles. Harvest priorities are also determined based on recent mountain pine beetle infestations, with harvesting newly attacked coniferous stands a priority before the stand value deteriorates.

21.3.6 Outlook

Analysis completed for the most recent timber supply review for the Fort St. John TSA indicated that a harvest volume of 2.72 million m^3 could be maintained for three decades, after which time it would decline to 2.44 million m^3 (BCMFR 2003b). The AAC was set in 2003 at 2.115 million m^3. In 2007, the Chief Forester issued a delay order, postponing the next AAC determination to 2013 because he concluded that the current AAC would likely not change with a new determination (BCMFR 2007b). The timber supply analysis for the Dawson Creek TSA is scheduled for completion in late 2012. TFL 48's current AAC of 900,000 m^3 is elevated to salvage pine stands susceptible to mountain pine beetle attack. The timber supply analysis completed for the latest determination indicated that a harvest level of 737,000 m^3 could be maintained indefinitely (BCMFR 2007a).

21.4 Effects Assessment

The potential to adversely affect forestry was assessed by taking into account the potential for the Project to result in changes to the following key aspects:

- Land use, resource use, access, and activities related to industrial forestry use
- Crown forest management

The Project's effect on Crown forest management would be addressed by existing processes in which suitable forest lands would be located such that the biodiversity targets would continue to be met. This aspect of the Project was addressed in Section 21.1.3.

Changes in land use, resource use, access, and activities related to industrial forestry use will result in the clearing of merchantable timber from the Project activity zone and the continuing overlap of the Project activity zone on the timber harvesting land base. The changes in the aspect are assessed taking into account the changes in the following key indicators:

- Timber harvesting land base
- Allowable annual cut
- Merchantable timber volume harvested according to the clearing plan
- Harvest trends
- Forest sector employment
- B.C. government stumpage revenue

21.4.1.1 Timber Harvesting Land Base

The Project activity zone would overlap the three management units and relatively small areas of THLB in each unit (Table 21.9). The total THLB in the Project activity zone is estimated to be 409.8 ha, distributed over the three management units, or 0.0002% of their THLB. For context, proposed mine developments in the region would typically have greater effects on THLB (B.C. Ministry of Forests, Lands and Natural Resource Operations, Project Manager 2012, pers. comm.)

Table 21.9 Potential Timber Harvesting Land Base in the Project Activity Zone

Classification	Overlap by Management Unit (ha)			
	Dawson Creek	Fort St. John	TFL 48	Total
Project activity zone	7,201.7	7,731.4	355.2	15,288.3
Timber Harvesting Land Base in Project activity zone	132.0	190.5	87.3	409.8

NOTE:
Source: IFS 2012

21.4.1.2 Annual Allowable Cut

Reductions in the THLB could result in reductions in the AAC. The estimated total AAC contribution of the THLB in the Project activity zone is 933 m^3 per year, shown in Table 21.9, or 0.02% of the AAC in each management unit. A reduction of this magnitude would not be expected to trigger a reduction of harvest quotas contained in forest tenures held by industry to cut timber in the management unit (B.C. Ministry of Forests, Lands and Natural Resource Operations, Project Manager 2012, pers. comm.). Hence, there would be no expected change in harvest volumes and associated economic activity due to the Project overlap with THLB.

Table 21.10 Potential Change to AAC

Forest Management Unit	Estimated AAC Contribution of THLB in Project Activity Zone (m^3/year)	AAC Impact as Percent of Management Unit AAC [a] (%)
Fort St. John TSA	381	0.02
Dawson Creek TSA	336	0.02
TFL 48	216	0.02
Total	**933**	**0.02**

NOTES:

[a] Percentage estimated by dividing the AAC effect shown in this table by the Management Unit's AAC reported in Table 21.7, which are the sums of the coniferous and deciduous volumes

Source: IFS 2012

The project's transmission line right-of-way and Del Rio off-site material source location would overlap approximately 7 ha of the area of a woodlot licence. Mitigation for the woodlot licensee would be addressed by B.C. Ministry of Forests, Lands and Natural Resource Operations by providing a suitable replacement area such that the potential reduction associated with the Project is fully offset (B.C. Ministry of Forests, Lands and Natural Resource Operations, Project Manager 2012, pers. comm.).

21.4.1.3 Merchantable Timber from Project Clearing Plan

The expected volume of merchantable timber to be cleared within the Project activity zone, by year and by project component, is summarized in Table 21.11. The harvest volume of merchantable timber would be made available in Years 1 to 4 of construction. The total estimated volume is 1.4 million m^3, with about 80% of that volume being available in Years 1 and 2. Further information on the timber volume, areas, and species that would be cleared is available in Volume 1 Appendix A Vegetation, Clearing, and Debris Management Plan.

Table 21.11 Merchantable Volume by Year and Project Activity Zone

Year	Project Activity Zone	Merchantable Volume (m^3)
1	Dam Site	292,618
	Highway 29 Realignment	9,515
	Construction Material Sites	5,695
	Access Road	11,864
	Reservoir	127,922
2	Construction Material Sites	60,180
	Access Road	9,203
	Reservoir	208,419
	Transmission Corridor	130,808
3	Highway 29 Realignment	14,470
	Construction Material Sites	23,581
	Access Road	9,161
	Reservoir	188,933
	Access Road	11,367
4	Reservoir	310,307
All Years	Dam Site	292,618
	Highway 29 Realignment	23,986
	Construction Material Sites	89,455
	Access Road	41,594
	Reservoir	835,580
	Transmission Corridor	130,808
	Grand Total	**1,414,042**

NOTE:
Source: Volume 1 Appendix A Vegetation, Clearing, and Debris Management Plan

The majority of the merchantable timber cleared would only be available for harvest if the Project proceeds, as it is not located in the current THLB; therefore, clearing of this volume would be net incremental volume.

21.4.1.4 Mill Capacity and Harvest Trends

The existing regional forest industry (i.e., within a 100 km radius of the proposed Project) has the capacity to utilize all of the merchantable wood that would be harvested for Project clearing purposes. The merchantable volume from the Project clearing activities would equate to approximately 33% of the forest industry's annual deciduous volume demand and 15% of the annual coniferous log demand (IFS 2012), with the volume mostly distributed over Years 1 and 2 of Project construction. Mills currently purchase about 25% to 30% of their logs from the market; hence, the Project volume may be expected to compete within the established regional market. Given market process, the Project volume may displace higher cost wood sources for the several years the clearing plan is in operation, or incrementally increase total harvest volume if the industry is supply constrained at the time the clearing volume comes to market. As noted in the baseline, recent harvest volume has been consistently less than the licence volume available. Therefore, the Project would not be expected to change overall harvest trends in the region, as annual fibre sources to mills are commonly influenced by market supply and price factors.

21.4.1.5 Forest Sector Employment

The merchantable volume would support employment in the logging and wood manufacturing industries. The logging employment is embedded in the Project construction employment estimates, but manufacturing employment is not. It is estimated that a total of 570 person-years of employment would be supported in regional mills in processing the timber from the Project clearing plan (B.C. Ministry of Forests, Lands and Natural Resource Operations 2012). If the logs from the clearing plan are displacing higher cost logs, employment in both the harvesting and milling phases would exist at about the same magnitude without the Project.

21.4.1.6 Government Revenue

The merchantable timber would be subject to stumpage charge, as determined by application of the Interior Appraisal Manual and policies that apply at the time of harvest. The determination of the stumpage rate using the Interior Appraisal Manual is in accordance with the Canada/U.S. Softwood Lumber Agreement. The revenue collected would add incrementally to government revenue.

21.5 Summary of Effects Assessment and Mitigation Measures

The Project's potential to adversely affect forestry was assessed with respect to its effect on two aspects: 1) land use, resource use and related forestry use and 2) forest management. The Project activity zone overlaps a relatively small amount of THLB, or the land base on which industrial forestry activity would occur. The total of some 410 ha accounts for less than 0.02% of the industry's total THLB. It follows from the negligible land effect that there would be no effect on the AAC or the licence quotas held by industry to harvest Crown timber. A portion of area-based wood lot licence is overlapped by the Project activity zone but suitable replacement land would be made available by B.C. Ministry of Forests, Lands and Natural Resource Operations. There is no adverse residual effect on forestry associated with the Project's effects on land use and activities related to forest industry use.

The LAA's established timber mills have the capacity to process the merchantable timber volumes associated with the clearing volumes. Mills may obtain the timber through established market arrangements (e.g., bid on a harvesting contract or purchase logs from an independent logger).

The Project activity zone overlaps four OGMAs, which were established to achieve biodiversity targets for each TSA. The B.C. Ministry of Forests, Lands and Natural Resource Operations would address this effect by existing procedures and policies that would result in fully mitigating the potential Project effects such that the biodiversity targets would continue to be met.

No residual effects are anticipated for forestry; therefore, no mitigation measures are required.

Table 21.12 Project Effects and Mitigation Measures on Forestry

Project Phase	Potential Effects	Mitigation Measures	Mitigation Effectiveness	Responsibility
Construction and Operations	Change in land use, resource use, access, and activities related to industrial forestry use	No change anticipated to industrial forest use	N/A	N/A
Construction and Operations	Change in land use that affects Crown Forest Management	The province would use existing policies to manage changes to Old Growth Management Areas and one wood lot license area	N/A	N/A

NOTE:
N/A – not applicable

As referenced in Volume 2 Section 11.3 Land Status, Tenure, and Project Requirements, BC Hydro will discuss any overlap with the Project activity zone and the area within the impact lines with affected forest operators and, where appropriate, enter into agreements regarding potential conflicts. This mitigation measure is considered standard mitigation, per Volume 3 Section 23 Minerals and Aggregates, Section 23.1.3 Standard Mitigation Measures and Effects Addressed.

21.5.1 Other Mitigation Options Considered

There were no other mitigation measures considered by BC Hydro for effects on Forestry.

21.6 Residual Effects

No residual effects are anticipated, as no project effects were identified.

21.7 Cumulative Effects Assessment

No cumulative effects are anticipated, because no residual effects are anticipated.

21.8 Monitoring and Follow-Up

Monitoring and follow-up is not required for forestry.

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