QUEBEC FORESTRY SECTOR CARBON SEQUESTRATION GROUPED PROJECT - PIVOT

PIVOT

PROJET FORESTIER

Document Prepared by Société de Gestion de Projets Ecotierra Inc.

Project Title	Quebec Forestry Sector Carbon Sequestration Grouped Project - PIVOT
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Prepared By	Société de Gestion de Project Ecotierra Inc. Luis Salgado – NBS and Climate Finance Director Marcela Vera – NBS and Climate Finance Expert
Contact	Luis Salgado 2984 des Chênes street, suite 101,Sherbrooke, QC, Canada, J1L 1Y1 T1-819-300-4272 / l.salgado@ecotierra.co / www.ecotierra.co

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The Quebec Forestry Sector Carbon Sequestration Grouped Project (PIVOT) is implemented and operated by Ecotierra in association with Forêt Hereford with the support of the Laval University as scientific partner. PIVOT is a grouped project expecting to cover 15,000 ha of private land of forest remaining forest or non-forest converted to forest lands, including IFM-ERA, IFM-LtPF and ARR activities in the province of Quebec (Canada). This Monitoring Report covers the period between 1-January-2018 and 18-July-2022.

Emission reductions / removals were generated in two instances for verification (one for ERA and one for LtPF activities) and three instances for the validation of the inclusion process (one for ERA and two for LtPF activities). Before their inclusion in the project, all five instances were managed for timber extraction following the normal practices in the region. Up to date no instances are claiming or will claim for credits under ARR activities. Up to date, PIVOT has trained and recognized 42 entities as potential aggregators for PIVOT and it is currently assessing eligibility of 238 ha to be included over the next months to the project.

Instance	Agregator	Areas (ha)	Inclusion (DD/MM/YYYY)	Status	Location (region)
FHI_2017_ERA_001	Forêt Hereford Inc	133.6	01-01-2018	Verification	Estrie
FHI_2017_LTPF_001	Forêt Hereford Inc	664.9	01-01-2018	Verification	Estrie
ACA_2021_ERA_002	Corridor Appalachian	401.6	19-07-2022	Validation for inclusion	Estrie
ACA_2021_LTPF_002	Corridor Appalachian	509.4	19-07-2022	Validation for inclusion	Estrie
SMB_2022_LTPF_003	Société de Conservation de Mont-Bromont	256.3	19-07-2022	Validation for inclusion	Estrie

During this monitoring period the gross removal/reduction for the project is 85 381 tCO_2e. Considering a Non-Permanence Risk rating of 10% for both instances under verification, the total amount of VCUs requested for issuance is 84, 000.

The following table presents the audit history of the project.

Audit Type	Period	Program	VVB Name	Number of years
Validation	1-January-2018 – 1-January. 2097	VCS	Ecocert SA	80 years
Verification	1-January-2018 -18-July-2022	VCS	AENOR International S.A.U.	4.5 years
Total	1-January-2018 -18-July-2022	VCS	_____	4.5 years

1.2 Sectoral Scope and Project Type

Sectoral scope: 14-Agriculture Forestry and Other Land Use (AFOLU)

Project category: Improve Forest Management (IFM)

Afforestation, Reforestation and Revegetation (ARR)

Project activity: Logged to Protected Forest (LtPF)

Extended Rotation Age / Cutting Cycle (ERA)

Afforestation, Reforestation and Revegetation (ARR)

Grouped project (Yes/No): Yes

1.3 Project Proponent

Primary Project Proponent

Organization name	Société de gestion de projets ECOTIERRA Inc.
Contact person	Etienne Desmarais
Title	President
Address	2984 de Chênes street, suite 101, Sherbrooke, Québec, Canada, J1L 1Y1
Telephone	+1 819 300-4272
Email	e.desmarais@ecotierra.co

Other Project Proponent

Organization name	Forêt Hereford Inc. (FHI)
Contact person	Dany Senay
Title	Director
Address	294 Rue Saint-Jacques Nord, Coaticook, Québec, Canada, J1A 2R3
Telephone	+1 819 578-4605
Email	dany.senay@forethereford.org

1.4 Other Entities Involved in the Project

Organization name	Université Laval
Role in the Project	Scientific Partner
Contact person	Guy Mercier
Title	Dean, Faculty of Forestry, Geography and Geomatics
Address	Pavillon Abitibi-Price, 2405, rue de la Terrasse, Université Laval, Québec Canada, G1V 0A6

Telephone	+1 418 656-2116
Email	ffgg@ffgg.ulaval.ca

1.5 Project Start Date

The project start date was defined in the project document as the moment where PIVOT was ready to start the monitoring of forest growth and had an adjusted baseline growth of the first group of instances by January 1st, 2018.

1.6 Project Crediting Period

For this grouped project, the total length of the grouped project crediting period is: 80 years.
Start Date: 1 January 2018.
End Date: 31 December 2097.

1.7 Project Location

All instances implementing eligible activities under PIVOT shall be in lands corresponding to the following Bioclimatic Domains[1] :

- Sugar maple-bitternut hickory
- Sugar maple-basswood
- Sugar maple-yellow birch
- Balsam fir-yellow birch
- Balsam fir-white birch west

These in turn are part of three vegetation sub-zones of the province of Quebec in Canada: The Continuous Boreal Forest, the Mixed Forest, and the Deciduous Forest Temperate Forest.

Over the project crediting period, instances will be defined including their exact location. For administrative purposes, the grouped project location is defined by the following table[2] :

[1] The Ecological Land Classification Hierarchy is a planning tool developed by the Quebec Government to allow the forestry sector to prepare forest operations and management plans in conformity with the principles of biodiversity conservation and sustainable development.

[2] As the project potential area is based on ecological consideration, not all the area under each administrative region is part of the project potential area.

Table 1. Administrative location of the potential project area

Province	Administrative region	Regional county municipalities (MRC) or other type of territories	Regional Agency for private forests development (ARMVFP)
Quebec	Bas-Saint-Laurent	Kamouraska	ARMVFP du Bas-Saint-Lauren (011)
		La Matapédia	
		La Mitis	
		Les Basques	
		Matane	
		Rimouski-Neigette	
		Rivière-du-Loup	
		Témiscouata	
	Saguenay–Lac-Saint-Jean	Lac-Saint-Jean-Est	ARMVFP du Lac-Saint-Jean (022)
		Domaine-du-Roy	
		Maria-Chapdelaine	
		Fjord-du-Saguenay	ARMVFP du Saguenay (021)
	Capitale-Nationale	Charlevoix	ARMVFP de Québec 03 (031)
		Charlevoix-Est	
		La Côte-de-Beaupré	
		L'Île-d'Orléans	
		La Jacques-Cartier	
		Portneuf	
		Agglomeratino of Quebec City	
	Maurice	Les Chenaux	ARMVFP mauriciennes (041)
		Maskinongé	
		Mékinac	
		Agglomeration of La Tuque	
		Shawinigan	
		Trois-Rivières	
	Estrie	Coaticook	ARMVFP de l'Estrie (051)
		Le Granit	
		Le Haut-Saint-François	
		Le Val-Saint-François	
		Les Sources	
		Memphrémagog	
		Sherbrooke (equivalent territory)	
	Outaouais	La Vallée-de-la-Gatineau	ARMVFP de l'Outaouais (071)
		Les Collines-de-l'Outaouais	
		Papineau	

		Pontiac	
		Gatineau (equivalent territory)	
	Abitibi-Témiscamingue	Abitibi	ARMVFP de l'Abitibi (082)
		Abitibi-Ouest	
		La Vallée-de-l'Or	
		Rouyn-Noranda (independent city)	
		Témiscamingue	ARMVFP du Témiscamingue (081)
	Côte-Nord	Caniapiscau	ARMVFP de la Côte-Nord (091)
		La Haute-Côte-Nord	
		Le Golfe-du-Saint-Laurent	
		Manicouagan	
		Minganie	
		Sept-Rivières	
	Gaspésie–Îles-de-la-Madeleine	Avignon	ARMVFP de la Gaspésie-les-Îles (111)
		Bonaventure	
		Le Rocher-Percé	
		La Côte-de-Gaspé	
		La Haute-Gaspésie	
	Chaudière-Appalaches	Bellechasse	ARMVFP des Appalaches (122)
		L'Islet	
		Les Etchemins	
		Montmagny	
		Levis (equivalent territory)	
		Beauce-Sartigan	ARMVFP de la Chaudière (121)
		La Nouvelle-Beauce	
		Les Appalaches	
		Lotbinière	
		Robert-cliché	
	Lanaud'ère	D'Autray	ARMVFP de Lanaudière (141)
		Joliette'	
		L'Assomption	
		Les Moulins	
		Matawinie	
		Montcalm	
	Laurentides	Antoine-Labelle	Agence régionale de mise en valeur des forêts privées des Laurentides (151)
		Argenteuil	
		Deux-Montagnes	

Province	Administrative region	Regional county municipalities (MRC) or other type of territories	Regional Agency for private forests development (ARMVFP)
Quebec	Bas-Saint-Laurent	Kamouraska	ARMVFP du Bas-

		La Rivière-du-Nord	
		Les Laurentides	
		Les 'ays-d'en-Haut	
		Thérèse-De Blainville	
		Mirabel (equivalent territory)	
	Montérégie	Acton	Agence forestière de la Montérégie (161)
		Brome-Missisquoi	
		La Haute-Yamaska	
		La Vallée-du-Richelieu	
		Le Haut-Richelieu	
		Les Maskoutains	
		Margue'ite-D'Youville	
		Beauharnois-Salaberry	
		Le Haut Saint-Laurent	
		Les Jardins-de-Napierville	
		Roussillon	
		Vaudreuil-Soulanges	
		Pierre-De Saurel	
		Rouville	
		Alogmeration of Longueuil (equivalente territory)	
	Centre-du-Québec	Arthabaska	Agence forestière des Bois-Francs (171)
		Bécancour	
		Drummond'	
		L'Érable	
		Nicolet-Yamaska	

		La Matapédia	Saint-Lauren (011)
		La Mitis	
		Les Basques	
		Matane	
		Rimouski-Neigette	
		Rivière-du-Loup	
		Témiscouata	
	Saguenay–Lac-Saint-Jean	Lac-Saint-Jean-Est	ARMVFP du Lac-Saint-Jean (022)
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		Maria-Chapdelaine	
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		L'Île-d'Orléans	
		La Jacques-Cartier	
		Portneuf	
		Agglomeratino of Quebec City	
	Maurice	Les Chenaux	ARMVFP mauriciennes (041)
		Maskinongé	
		Mékinac	
		Agglomeration of La Tuque	
		Shawinigan	
		Trois-Rivières	
	Estrie	Coaticook	ARMVFP de l'Estrie (051)
		Le Granit	
		Le Haut-Saint-François	
		Le Val-Saint-François	
		Les Sources	
		Memphrémagog	
		Sherbrooke (equivalent territory)	
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		Les Collines-de-l'Outaouais	

		Papineau	
		Pontiac	
		Gatineau (equivalent territory)	
	Abitibi-Témiscamingue	Abitibi	ARMVFP de l'Abitibi (082)
		Abitibi-Ouest	
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		Le Golfe-du-Saint-Laurent	
		Manicouagan	
		Minganie	
		Sept-Rivières	
	Gaspésie–Îles-de-la-Madeleine	Avignon	ARMVFP de la Gaspésie-les-Îles (111)
		Bonaventure	
		Le Rocher-Percé	
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		Les Etchemins	
		Montmagny	
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		Beauce-Sartigan	ARMVFP de la Chaudière (121)
		La Nouvelle-Beauce	
		Les Appalaches	
		Lotbinière	
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	Lanaud'ère	D'Autray	ARMVFP de Lanaudière (141)
		Joliette'	
		L'Assomption	
		Les Moulins	
		Matawinie	

		Montcalm	
	Laurentides	Antoine-Labelle	Agence régionale de mise en valeur des forêts privées des Laurentides (151)
		Argenteuil	
		Deux-Montagnes	
		La Rivière-du-Nord	
		Les Laurentides	
		Les ’ays-d'en-Haut	
		Thérèse-De Blainville	
		Mirabel (equivalent territory)	
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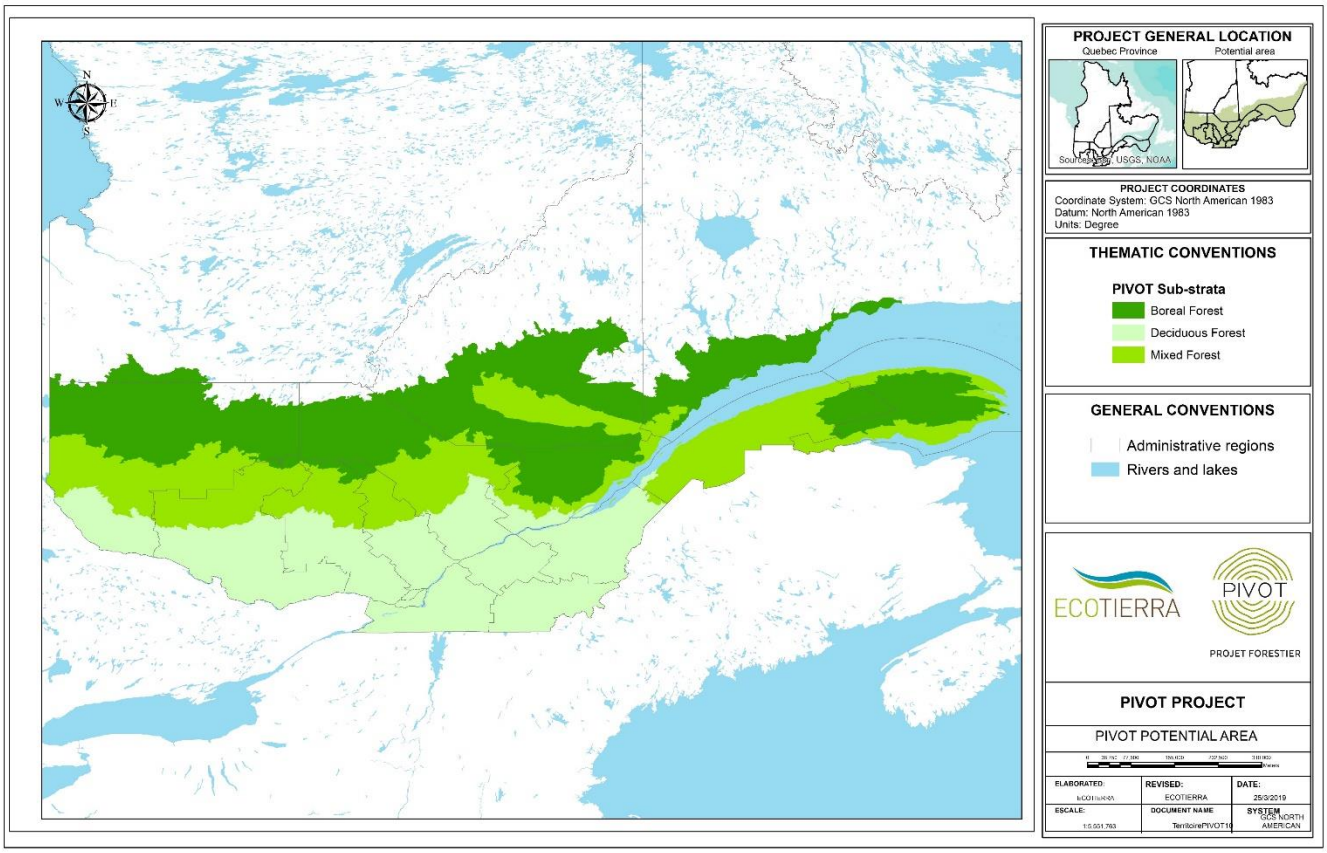
		La Vallée-du-Richelieu	
		Le Haut-Richelieu	
		Les Maskoutains	
		Margue’ite-D'Youville	
		Beauharnois-Salaberry	
		Le Haut Saint-Laurent	
		Les Jardins-de-Napierville	
		Roussillon	
		Vaudreuil-Soulanges	
		Pierre-De Saurel	
		Rouville	
		Alogmeration of Longueuil (equivalente territory)	
	Centre-du-Québec	Arthabaska	Agence forestière des Bois-Francs (171)
		Bécancour	
		Drummond’	
		L'Érable	
		Nicolet-Yamaska	

Figure 1 – PIVOT project area



Instances under verification

1.7.1.1 Aggregator - FORÊT HERFORD INC.(FHI)

Forêt Hereford inc. (FHI) is a charity created in 2013, owning around 5,400 hectares of working private forests, managed under the concept of a community forest. The land under their administration is open for public outdoor activities and is managed to maintain forest as forest while generating revenues to be self-sufficient, mainly through timber production.

Regarding the regulatory surplus for the validated PAIs required by VCS v.4.5, it is important to highlight that at the time of signing of the preliminary considerations and before the acquisitions, the properties did not benefit from any legal or voluntary protection status, as it specified in 7.3 Eligibility Report of this instance. The Hereford Forest property is a forest property that has been exploited for timber for several decades and is under the jurisdiction of the MRC of Coaticook. Under the municipal regulations of this MRC, all harvesting modalities (0-100% of commercial trees) are permitted in its territory,

supported by a silvicultural prescription signed by a forest engineer[3]. These regulations were reviewed and assessed during eligibility procedure by the project team and validated by Ecocert in 2019 for Instances FHI_2017_ERA_001 and FHI_2017_LtPF_001.

Forêt Hereford, owner since 2012 and derives its main income from harvesting. A forest management plan has been produced and covers the period 2013 to 2023. It considers the forest conservation easement which protects certain sites with high conservation value, as well as the applicable provincial and municipal regulations. The main constraints on harvesting come from the forest conservation easement[4] which identifies areas where logging is not permitted. These areas were considered in the Forest Management Plan. They also served as a basis during the Hereford Forest zoning process that begun in 2017. During this process, carbon credit zones were identified, by the community, outside the sectors already protected by the servitude[5]. The sectors in Pivot were therefore not subject to any regulatory or operational constraints. They were established outside the exclusion zones of the 2013 allowable forestry calculation. And the new 2023-2033 forest management plan took over all these elements[6].

Instance FHI_2017_ERA_001

This instance is in the Estrie administrative region, Coaticook Regional County Municipality, Municipalities of East Hereford and Saint-Herménégilde, including a total of 133.6 ha belonging to FHI. All eligible parcels, that make up the instance are part of the Deciduous Forest stratum, have been identified and all polygons have been defined using SIG software.

The following figure shows the geographical location of all areas part of the instance. A KML file as well as a shp is provided as an annex[7].

Figure 2. Adjusted geographic reference of instance FHI_2017_ERA_001 (eligible areas of the property)

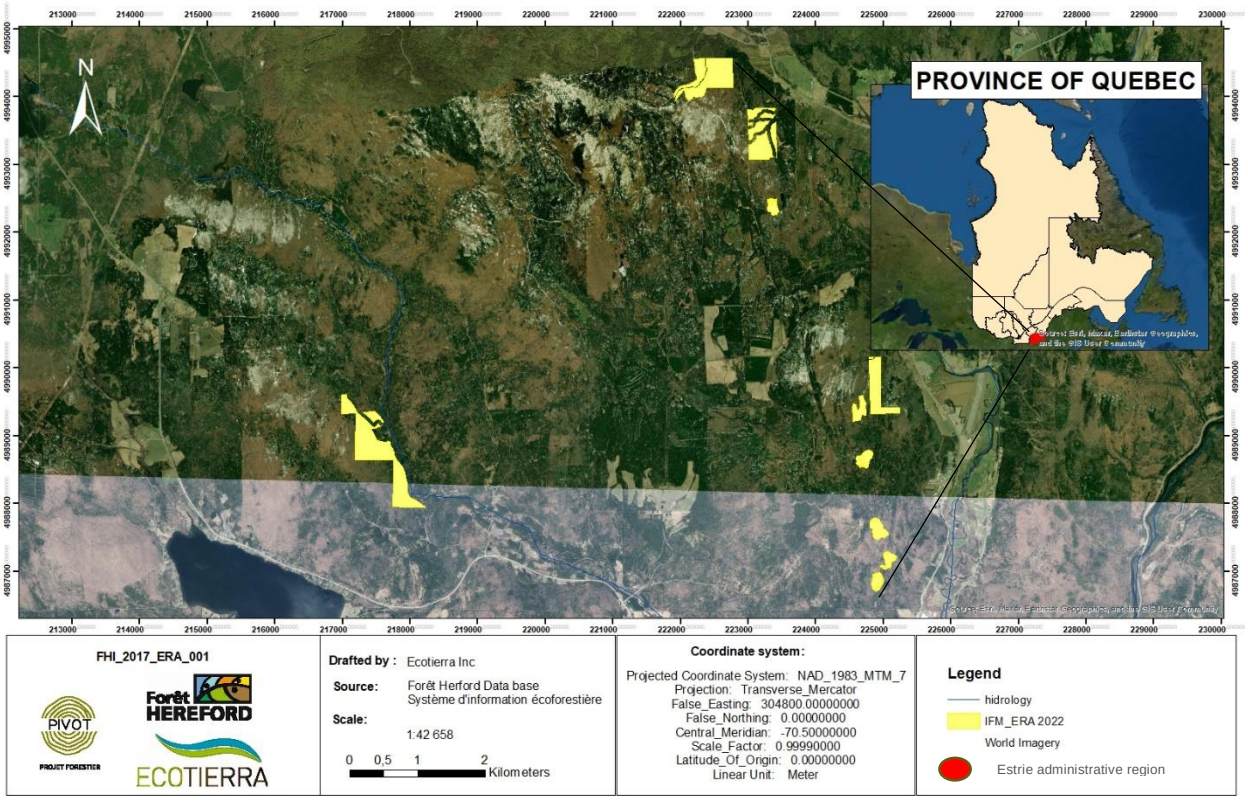
[3] Available in: https://www.mrcdecoaticook.qc.ca/Documentation/RCI/RCI%207-002%20(2016)_version%20admin._MAJ_24072017.pdf

[4] Accessible en ligne https://www.forethereford.org/fr/foret-conservation/documents/Resume_servitude.PDF

[5] Carte du zonage accessible en ligne https://www.forethereford.org/fr/a-propos/documents/Zonage_sc_comite_consultatif.png .

[6] Plan général d'aménagement forestier de la Forêt Hereford 2023-2033, accessible en ligne https://www.forethereford.org/upload/PGAF_FHI_sign%C3%A9.pdf .

[7] See folder "kml" and "shp" FHI_2017_ERA_001\GIS



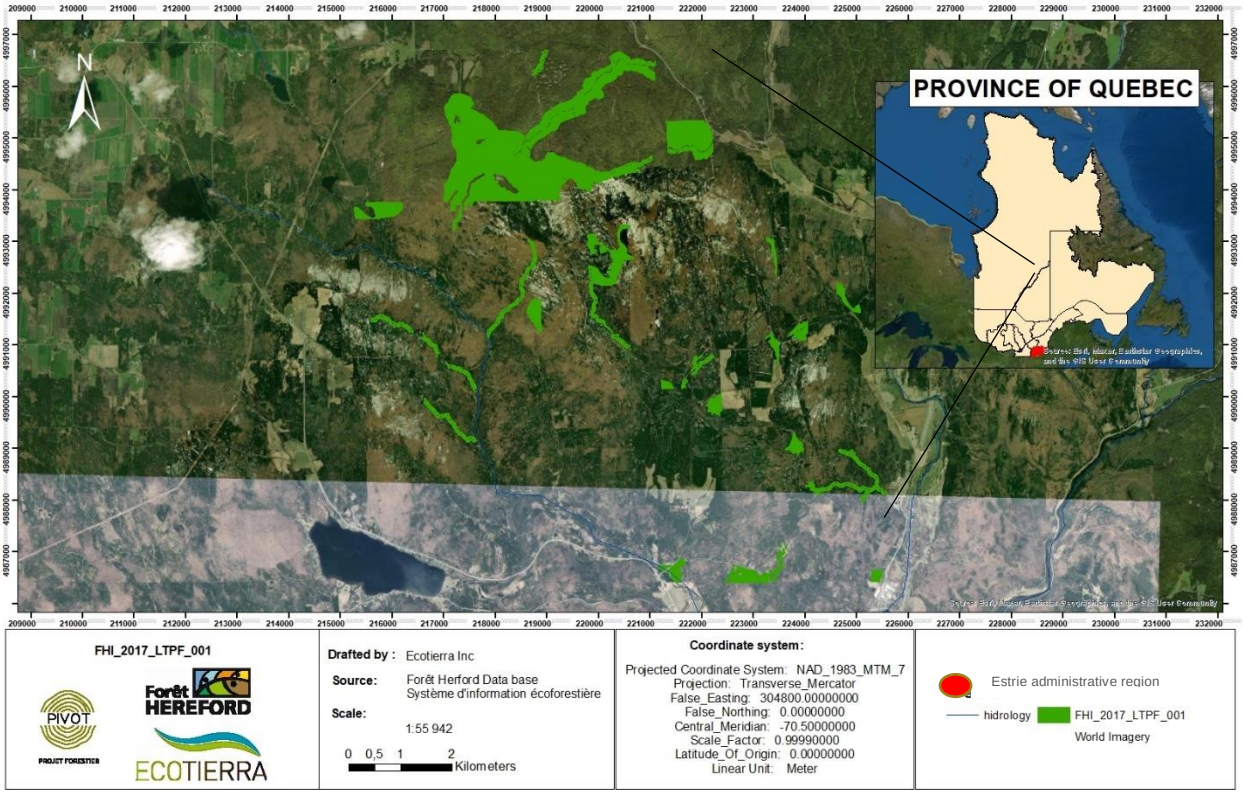
1.7.1.1.1 Instance FHI_2017_LTPF_001

This instance is in the Estrie administrative region, Coaticook Regional County Municipality, Municipalities of East Hereford and Saint-Herménégilde, including a total of 664.9 ha belonging to FHI. All eligible plots that make up the instance are part of the Deciduous Forest stratum, have been identified and all polygons have been defined using SIG software. This instance covers larger riparian areas, high conservation value forests and recreational actual and potentials forests.

The following figure shows the geographical location of all areas part of the instance. A KML file as well as a shp is provided as an annex[8].

[8] See folder “kml” and “shp” FHI_2017_LtPF_001\GIS

Figure 3. Adjusted geographic reference of instance FHI_2017_LtPF_001 (eligible area of the property)



Instances under validation

1.7.1.2 Aggregator - Corridor Appalachien (ACA)

Corridor Appalachien (ACA) is a non-profit conservation organization founded in 2002 to promote the protection of natural areas in the Appalachian region of Southern Quebec. Corridor Appalachien works with local communities to maintain and restore the ecology of the region with a perspective of sustainable development. Instances ACA_2021_LTPF_002 and ACA_2021_ERA_002 aggregated by Corridor Appalachien are in the Deciduous Forest stratum, being part of the Estie administrative region, in the municipalities of St-Étienne-de-Bolton, Canton d'Orford, Bolton-Ouest and Bolton-Est. ACA is an aggregator for PIVOT since October 1st, 2021.

1.7.1.2.1 Instance - ACA_2021_LTPF_002

Following the eligibility analysis (see section 3.3) for each five forest properties willing to be part of the instance, a total of 509.4 ha was selected as eligible for this LtPF instance. The following Table 2 shows the participating parcels, location, and area details.

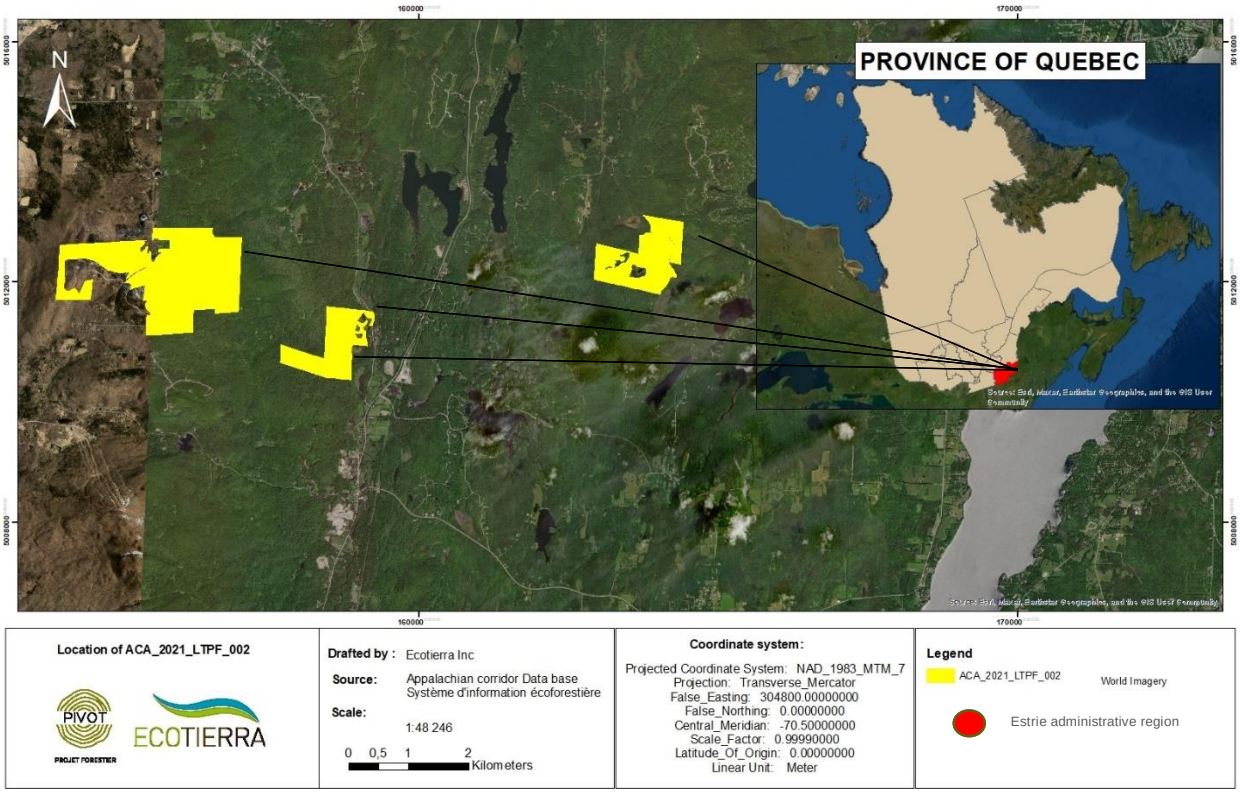
Table 2. Participating parcels under ACA_2021_LTPF_002

Name of the Property	Total area of the Property (ha)	Pivot eligible area (ha)	% of the property eligible for the instance	Municipality	Lot numbers
Brisebois-Suprenant	93.0	85.6	16.9 %	St-Étienne-de-Bolton	5193272; 5192036; 5662872; 5662873
Collins	13.0	12.7	2.4 %	Canton d'Orford	5035863
SIFISA	94.0	94.0	18.5 %	St-Étienne-de-Bolton	51916629
Sud Participation (Mont Foster)	215.0	209.4	41.1 %	St-Étienne-de-Bolton and Bolton-Ouest	5191553; 6351070; 6351071
Nadeau	125.0	107.7	21.1 %	Bolton-Est	4860652; 4860653; 5002086
TOTAL	540.0	509.4			

Figure 4 shows the geographical location of all plots part of the instance[9].

[9] Reference to the KML file.

Figure 4. Geographic reference of instance ACA_2021_LTPF_002 (eligible area of the property)



Regarding the regulatory surplus for the validated PAIs required by VCS v.4.5, it is important to highlight that at the time of signing of the preliminary considerations and before the acquisitions, the properties did not benefit from any legal or voluntary protection status, as it specified in 7.3 Eligibility Report of this instance. This instance is a forest property owned by a conservation group which needs the carbon incomes to ensure its long-term protection. The inclusion procedures to Pivot project between Ecotierra, the aggregator and the owner began several months, even years, before the acquisition of the areas. Several analyzes were carried out as the Pivot methodology was developed and the acquisition projects developed. The aggregator has made the necessary checks regarding the applicable regulations, both at the municipal[10] and provincial level when analyzing eligibility. These regulations authorize a mean weighted harvesting of 32% of stems over a 15 year period (between 25% and 40% over 15 years depending of the municipality, see Table 3). Also, no municipal regulation requires not to carry out harvesting. For example, the Municipality of St-Étienne-de-Bolton, in which the Brisebois-Surprenant, SIFISA and Sud-Participation properties are located, specifies, in the areas of these properties, that harvesting is permitted at a rate of 20%. per 12-year period for areas with restrictions and 30% over

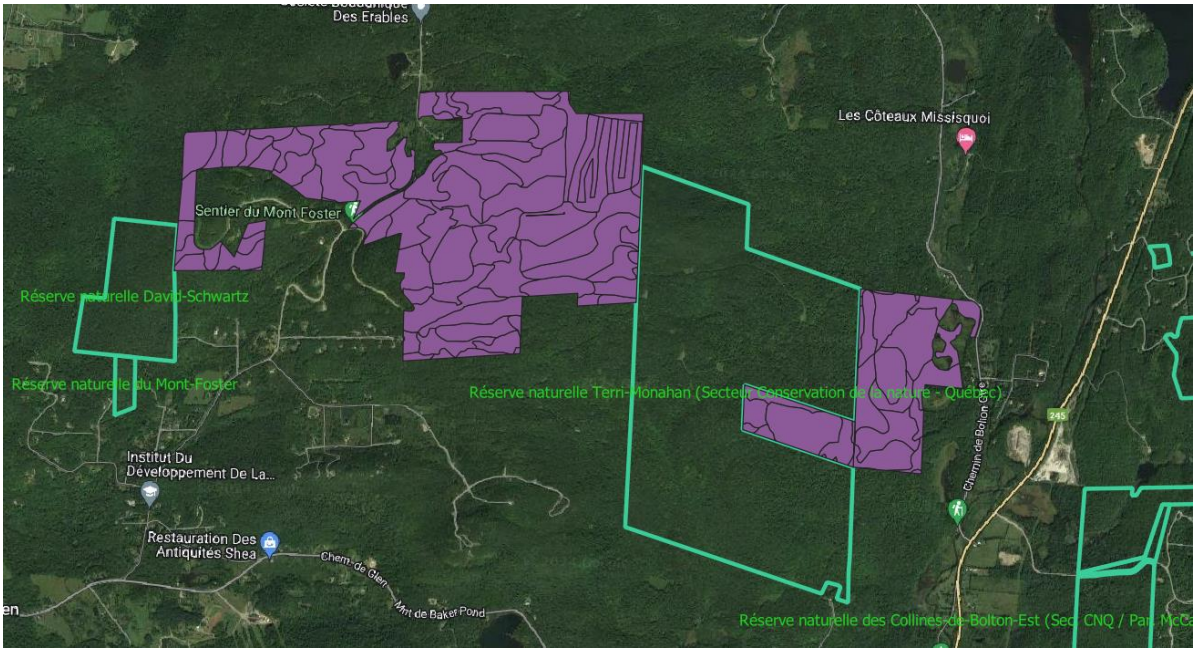
[10] This instance includes areas under the jurisdiction of St-Étienne-de-Bolton, Canton d'Orford, Bolton-Ouest and Bolton-Est.

12-year period for forestry zones, approximately 25% and 37.5% respectively per 15-year period. For the Collins property, in the Canton d'Orford, regulations allow forest harvesting of 30% per 12-year period, or 37.5% per 15-year period. As mentioned in the eligibility report, sectors of open wetlands as well as sectors of steep slopes were removed from the plots integrated into Pivot. The properties are today also protected by the Appalachian Corridor owner's mission (natural environment status in voluntary conservation recognized by the Government of Quebec), which also consolidates the permanence of carbon credits. Harvesting activities were carried out there recently and some of the owners were themselves forestry contractors (Ex. SIFISA).

Table 3. Mean weighted harvesting according to the municipality regulations for instance ACA_2021_LTPF_002

Parcel	Area under PIVOT (ha)	% of the instance	Jurisdiction	Article of the regulation	Harvesting limit (% of commercial trees)	Harvesting limit over 15 years (% of commercial trees)	Weighted harvesting
Brisebois-Suprenant	85.36	17%	St-Étienne-de-Bolton	117	30% over 12 years	37.5%	6.28
Collins	12.75	3%	Canton d'Orford	10.7 and 10.8	30% over 12 years	37.5%	0.94
SIFISA	94.08	18%	St-Étienne-de-Bolton	116	20% over 12 years	25%	4.62
Sud Participation (Mont Foster)	126.43	25%	St-Étienne-de-Bolton	116	20% over 12 years	25%	6.21
Sud Participation (Mont Foster)	83.73	16%	Bolton-Ouest	16.1.8	40% over 15 years	40%	6.58
Nadeau	107.03	21%	Bolton-Est	14.3	30% over 12 years	37.5%	7.88
Total							32%

Regarding the Terri Monahan Nature Reserve, it was acquired by the Nature Conservancy of Canada in 2015[11]. Appalachian Corridor is not the owner. This is an already protected natural environment, which have not been integrated into the Pivot Project. The numbers of this Nature Reserve[12] are also different from those of the parcels contained herein and listed in the Eligibility Report. The following map shows in green outline the nature reserves officially recognized in the Register of Protected Areas of Quebec[13] and in blue the instance concerned:



1.7.1.2.2 Instance - ACA_2021_ERA_002

Following the eligibility analysis, a total of 401.6 ha was approved to conform this ERA instance. The Khartoum property was accepted in PIVOT project as ACA_2021_ERA_002 instance. This instance is in

[11] https://www.lavoixdelest.ca/2015/01/15/la-memoire-de-terri-monahan-sera-honoree-345-hectares-proteges-a-perpetuite-5180ba2989cd1a0b6ee35191d2fbec50/

[12] Reconnaissance officielle de la réserve naturelle Terri Monahan, https://www.publicationsduquebec.gouv.qc.ca/fileadmin/gazette/pdf_encrypte/lois_reglements/2019A/103927.pdf

[13] Registre des Aires protégées du Québec, donnée géomatique téléchargée en ligne (31 janvier 2024), https://www.donneesquebec.ca/recherche/dataset/aires-protegees-au-quebec/resource/7d1ba01c-d251-460e-972b-7dcde6cf2fe0 .

the strata deciduous forest, in the Eastman municipality of Estrie administrative region. Table 4 shows the participating plots, location, and area details.

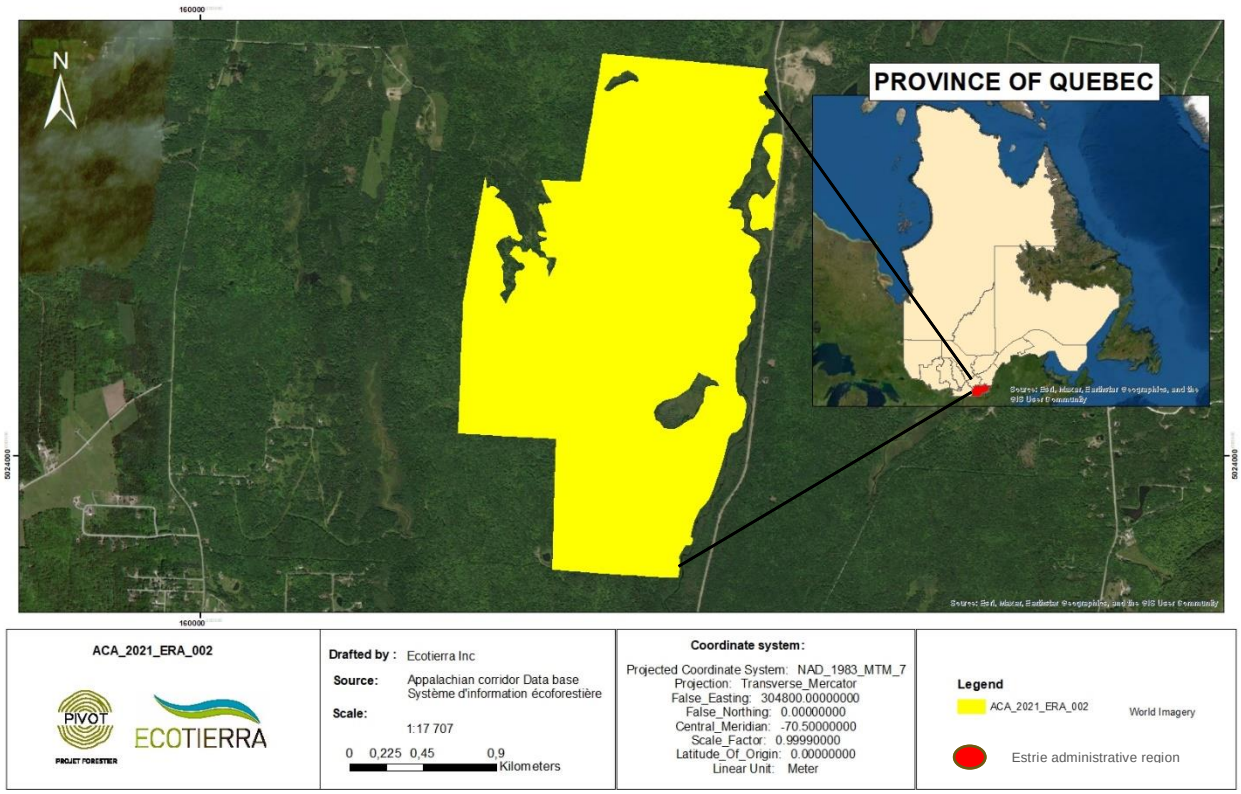
Table 4. Participating parcels under ACA_2021_ERA_002

Name of the Property	Total area of the property (ha)	Pivot eligible area (ha)	% of the property eligible for the instance	Municipality	Lot numbers
Khartoum	401.6	401.6	100 %	Eastman	2457078, 2236062, 2457092, 2457318, 2457322, 2457323, 2457324
TOTAL	401.6	401.6			

Figure 5 shows the geographical location of all plots part of the instance[14].

[14] Reference to the KML file

Figure 5. Geographic reference of instance ACA_2021_ERA_002 (eligible area of the property)



Regarding the regulatory surplus for the validated PAIs required by VCS v.4.5, it is important to highlight that at the time of signing of the preliminary considerations and before the acquisitions, the properties did not benefit from any legal or voluntary protection status, as it specified in 7.3 Eligibility Report of this instance. This instance is a forest property owned by a conservation group which needs the carbon incomes to ensure its long-term protection. The procedures between Ecotierra, the aggregator and the owner began several months, even years, before the acquisition of the plots. Several analyzes were carried out as the Pivot methodology was developed and the acquisition projects developed. The aggregator has made the necessary checks concerning the applicable regulations, both at the municipal and provincial level, which allow forest harvesting to be carried out as planned in the average of the Pivot baseline (30% harvest per period) over 15'year periods. The property is also located in the harvesting sector of the Zoning Plan. In harvesting sectors, the municipal regulations of Eastman provide that the harvesting of 30% of the stems is allowed every 12 years (equivalent 37.5% over 15 years). Any other harvesting modality, including clear cutting, is allowed with the silvicultural prescription from a forest engineer. As mentioned in the eligibility report, sectors of open wetlands as well as sectors of steep slopes were removed from the plots integrated into Pivot. The properties are today also protected by the Appalachian Corridor owner's mission (natural environment status in voluntary conservation recognized by the Government of Quebec), which also consolidates the

permanence of carbon credits. Harvesting activities were carried out there recently and the previous owner was a forestry company.

1.7.1.3 Aggregator - Société de conservation du Mont Brome (SMB)

The Société de conservation du Mont-Brome (SCMB) is a non-profit organization created in 2015, by the community and the City of Bromont, to accelerate the local objectives of forest conservation and assume the sustainability of forest properties under conservation agreements in the Brome Mountain Massif. SMB is an aggregator for PIVOT since March 3, 2022.

Instance SMB_2022_LTPF_003 aggregated by Société de conservation du Mont Brome is in the Deciduous Forest stratum being part of the Estrie administrative region in the municipality of Bromont.

1.7.1.3.1 Instance - SMB_2022_LTPF_003

The City of Bromont and the Société de conservation du Mont Brome are two organizations that have established a partnership for conservation in the City's territory. The eligibility analysis gave the result of 256.3 ha eligible for the SMB_2022_LTPF_003 instance. Table 5 shows the participating parcels, location, and area details.

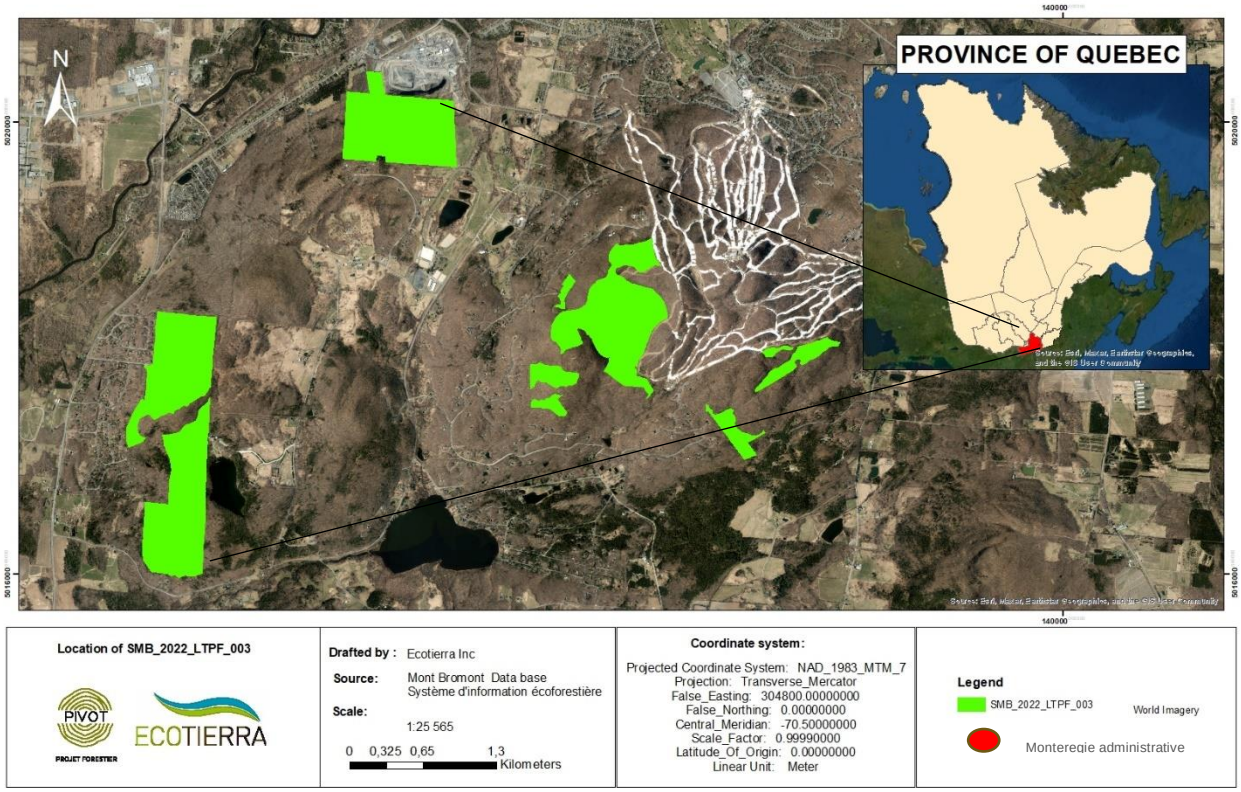
Table 5. Participating parcels under SMB_2022_LTPF_003

Name of the Property	Total area of the property (ha)	Pivot eligible area(ha)	% of the property eligible for the instance	Municipality	Lot numbers
Sommets	151.5	83.3	55%	Ville de Bromont	12 lots, 5088506, 5088507, 5903433, 6021107, 5370669, 5918106, 6021105, 4056640, 5496266, 6021768, 6021770, 6347488
Émond	82.6	74.5	90%	Ville de Bromont	8 lots, 2929398, 2929367, 2929366, 2929407, 2929372, 6152017, 6152018, 6153510,
Pépin	33.8	32	95%	Ville de Bromont	2 lots – 6122934 , 6122935
Accolas	11.2	6.9	61%	Ville de Bromont	1 lot - 6 352 013
Mont Oak			100%	Ville de Bromont	

TOTAL	338.8	256.3	76%		

The following Figure 6 shows the geographical location of all areas part of the Société de Conservation du Mont Brome were the project activities started to be carried out.

Figure 6. Geographic reference of instance SMB_2022_LTPF_003 (eligible area of the property)



Regarding the regulatory surplus for the validated PAIs required by VCS v.4.5, it is important to highlight that at the time of signing of the preliminary considerations and before the acquisitions, the properties did not benefit from any legal or voluntary protection status, as it specified in 7.3 Eligibility Report of this instance. This instance is a forest property owned by a conservation group which needs the carbon incomes to ensure its long-term protection. This process between the aggregator and the owner began several months, even years, before the acquisition of the forest plots. Several analyzes were carried out as the Pivot methodology was developed and the acquisition projects developed. According to the Municipal regulations at the moment of signing the Preliminary Considerations, allow logging to be carried out as planned in the Pivot. The municipal by-law of the City of Bromont provides that the harvesting trees for forestry work is allowed up to 30% of stems in a 10-year period (equivalent to 45% over 15 years and must be approved by a resolution of the municipal council. The areas have also been the subject of forestry work in the past, which is still clearly visible, and they were intended for forest harvesting and deforestation by the previous owner (see Eligibility report). As mentioned in the Eligibility Report, sectors of open wetlands as well as sectors of steep slopes have been removed from the plots integrated into Pivot. For the properties in this instance subject to a conservation easement, these

easements were all implemented after the signing of the Preliminary Considerations formalizing the start of their inclusion process in Pivot (as described in the Eligibility Report). This reality also consolidates the permanence of carbon credits.

1.8 Title and Reference of Methodology

The methodology applied by PIVOT is VM0034 “Canadian Forest Carbon Offset Methodology”, v2.0. The methodology also refers to the latest approved versions of the following, procedures, guidelines, and guidance:

- Canada’s Offset System for GHG Guide for Protocol Developers, Draft for Consultation, Version 1[15] - 2008
- IPCC 2003 GPG for LULUCF. Good Practice Guidance for Land Use, Land-Use Change and Forestry. The Intergovernmental Panel on Climate Change (IPCC), 2003.
- ISO 14064-2: 2006 (March 2006)
- IPCC Guidelines for National GHG Inventories (2006).
- System of Measurement and Reporting for Technologies[16]
- VCS Program Definitions (V 4.3 - 21 Dec 2022)
- VCS Standard (V 4.5 - 4 Oct 2023)
- VCS program guide (V 4.3 - 17 Jan 2023)
- WRI / WBCSD GHG Protocol for Project Accounting (V1 - 29 Nov 2005)
- American Carbon Registry Improved Forest Management Methodology (V1 - September 2010)
- British Columbia Forest Offset Guide. (Version 1.0 - June 30, 2016)
- Climate Action Reserve Forest Project Protocol (Version 3.2 - July 3, 2012)
- North American Forest Carbon Standard (Version 2.0 - June 2010)
- IPCC 2006 Guidelines for Forest Land. The Intergovernmental Panel on Climate Change (IPCC), 2006. Volume 4. Agriculture, Forestry and Other Land Use.

As well as the following tools

[15] https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system/federal-greenhouse-gas-offset-system/protocols.html

[16] Climate Change Technology Early Action Measures (TEAM) Requirements and Guidance for the System of Measurement And Reporting for Technologies (SMART), Government of Canada (2004).

- CDM Tool 02 "Combined tool to identify the baseline scenario and demonstrate additionality" V6 (24 July 2015)
- VCS Tool for AFOLU Non-Permanence Risk Analysis and Buffer Determination. V4.0 (19 September 2019).
- AR-TOOL 12 - Tool Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities V3.1 EB 85 annex 23 (24 Jul 2015)
- AR-TOOL 08 - Tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0 - 25 Nov 2011)

PIVOT also uses the following procedures, guidelines, and guidance:

- Canada's National Forest Inventory Ground Sampling Guidelines (Version 5 – October 2008)
- PIVOT standard operational procedures for
    - SOP Eligibility analyse (V1.0 -- 6-04-2020)
    - SOP Baseline adjustment IFM (V1.0 -- 6-04-2020))
    - SOP Monitoring Plan (V.1.0- 6-04-2020)

As well as the following tools

- Artemis (2014) - Guide d'utilisation du simulateur de croissance forestière Artémis-2014 sur Capsis
    - Winrock's CDM A/R Sample Plot Calculator Spreadsheet Tool (Walker, S.M., Pearson., TBrown, S. 2007, 2014 Version)
    - Pivot Project – Credit estimation tool (V.1-- 6-04-2020)
    - Pivot financial analyse tool (V.1- 6-04-2020)

1.9 Participation under other GHG Programs

PIVOT is a grouped multi activity forestry project and is not registered under any other GHG program. As mentioned in section 1.12.2 of the PD, if the project decides to participate in other GHG programs, the project proponents will follow the rules and requirement set out by the VCS Standard.

As part of the Participation Agreement signed by all forest owners and aggregators participating in the project, participants are engaged to avoid the inclusion of participating parcels in any other kind of GHG program or in any other kind of mechanism for the generation of GHG compensation units.

1.10 Other Forms of Credit of Credit and Supply Chain (Scope 3) Emissions

- The Project has not been registered or sought registration under any other Emission Trading Program or any other mechanism that includes GHG allowance trading.
- The Project has not sought or received another form of GHG-related environmental credit, including renewable energy certificates, during this monitoring period.
- Supply Chain (Scope 3) Emissions: the project activities don't affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain.

1.11 Sustainable Development Contributions

PIVOT contributes to SDG targets 6.6 and 15.2, promoting longer rotation periods over 535.2 ha and conserving 1430.6 ha of forest with timber harvesting history. PIVOT is also indirectly protecting 47.6 ha of wetland ecosystems inside areas participating in the project. All project areas are monitored following the project procedures.

PIVOT also contributes to SDG target 8.2 through the inclusion of climate finance mechanisms and carbon revenues to diversify revenue sources and access to financial mechanism towards a low carbon management and the conservation of forest lands.

PIVOT contributes to SDG target 13.2, indicator 13.2.2, reducing 135 927 tCO_2e over the monitoring period.

Table 6: Sustainable development contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1	6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.	6.6.1 Change in the extent of water-related ecosystems over time.	Implemented activities to increase	For this monitoring period, implemented activities avoid the reduction of forest cover in riparian strips of waterways by protecting the forests around them. PIVOT activities also contribute to protect wetlands inside properties participating in the project even if they are not eligible to be included as part of the project. At the moment 798.5 ha of forest has been protected and 18.7 ha of wetlands inside the areas of the instances participating in the project. Project and wetlands ecosystems area maps using the latest available information generated by the provincial government have been prepared as evidence of this contribution[17].	As this is the first monitoring period, current project contributions and contributions over project lifetime are the same.

[17] Project and wetlands ecosystem area map (Annex I. Maps of Wetlands_instances_ACA_FHI . Available in folder Annex)

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
2	8.2 Achieve higher levels of economic productivity through diversification, technological upgrading, and innovation, including through a focus on high value added and labor-intensive sectors	User defined indicator Increase in revenues by diversification of revenue sources for forest owners.	Implemented activities to increase.	Increase between 50% and 100% the mean revenues per ha for project participant compared to the baseline scenario, by accessing carbon market mechanisms and using climate finance tools for finance their inclusion in the project. A financial comparison between forest management and carbon revenues shows the impact of the project[18].	As this is the first monitoring period, current project contributions and contributions over project lifetime are the same.

[18] Financial comparison BS vs PS. See folder financial calculations of each instance.

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
3	13.2 Integrate climate change measures into national policies, strategies, and planning.	13.2.2 Tonnes of greenhouse gas emissions avoided or removed .	Implemented activities to Increase	During the first monitoring period, the project reduced 135,927 tCO_2e through the conservation and extended rotation of 664.9 and 133.6 ha respectively.	As this is the first monitoring period, current project contributions and contributions over project lifetime are the same.

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
4	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management	Implemented activities to increase	The project activities during this monitoring period, allowed better and diversify planning approaches at the landscape level over 828 ha of FHI. Total proposed areas and project eligibility areas maps using the latest available information generated by the provincial government have been prepared as evidence of this contribution[19].	As this is the first monitoring period, current project contributions and contributions over project lifetime are the same.

All SD contributions described in Table 6 of this report contribute to achieving the provincial and national sustainable development priorities. Firstly, in its Sustainable Development Strategy 2023-2028[20], the Quebec government plans to act in favor of nature and health, particularly by preserving environmental quality and our natural resources through sustainable resource management. Therefore, the conservation activities

[19] Total proposed areas and project areas map (see map of current project areas and potential project areas in the Eligibility analysis of each instance). See document "7.3 Rapport_éligibilité_ACA_2021-ERA-002" available in: ACA_2021_ERA_002\Elegibility Analyse. See document "7.3 Rapport_éligibilité_2021-LtPF-002" available in: ACA_2021_LTPF_002\Elegibility analyse. . See document "7.3 Rapport_éligibilité_2022-LtPF-001" available in: SMB_2022_LTPF_003\Elegibility Analyse.

[20] Available in : https://www.quebec.ca/en/government/policies-orientations/sustainable-development/government-strategy#c19600

initiated by the Pivot Project promote the preservation of natural spaces and quality wildlife habitats. The extension of harvest cycles promotes a more ecological and sustainable management of forest resources. The capture of a portion of greenhouse gases by Pivot activities will further enhance citizens' quality of life. Additionally, the government aims to involve the entire population in Quebec's sustainable development through its strategy. Thus, Pivot aligns with this objective as it proposes a collective approach to enhancing Quebec's forest heritage, with a strong participatory process allowing owners of small woodlots to contribute to the challenges of climate change mitigation and landscape protection. This project involves the community and facilitates the development of various partnerships with regional organizations, businesses, and municipalities. Consequently, through the Pivot Project, ECOTIERRA promotes citizen engagement and participation, as suggested by Quebec's sustainable development strategy.

The federal government in its Sustainable Development Strategy 2022-2026,[21] highlights the objectives that the Pivot Project can contribute to. Similarly, to the provincial objectives, Pivot, through its conservation and reduced harvesting of woody materials in forests, helps protect ecosystems on the territory. Moreover, through carbon offset measures, the project offers an alternative to forest exploitation activities, thus promoting more diversified economic growth. As it operates in the voluntary carbon market, Pivot contributes to climate change mitigation by providing compensation options for businesses undergoing ecological transition. Finally, through its deployment process, Pivot raises awareness not only among woodland owners but also among forest associations throughout the province about alternative approaches to traditional forest exploitation in the context of climate change mitigation.

[21] Available in : https://www.fsds-sfdd.ca/en

2 SAFEGUARDS

2.1 No Net Harm

The activities undertaken to meet the goals of the project, in coherence with the methodology, do not create any foreseeable potential negative environmental impacts and any potential impacts have been considered during the process of implementing the management plan for the properties.

The extension of the rotation age and the reduction in harvest intensity in the project areas could potentially result in lower harvest volumes in the short term, nevertheless this impact is not significant compared to the size of the timber market in the province and it is mitigated by the potential that the project actions may increase the overall volume and quality of wood flow in the longer term.

Research in Quebec proved that the conservation of forest lands and the reduction of the level intensity of timber harvest are positive for the conservation of the biodiversity. This issue is so important that a strategic plan has been developed for the south of Quebec by the *Regroupement national des conseils régionaux de l'environnement du Québec*, the Quebec center for biodiversity science, McGill University, the University of Quebec in Outaouais and the *Réseau de milieux naturels protégés* in 2022 , named *Livre blanc pour la protection de la biodiversité au sud du 49e parallèle* [22]*.,* specifically the Guideline 4, Recommendation 4.4, which refers to the integration of environmental, social and economic objectives in forest management planning and management.[23].

Also, the *Fédération des producteurs forestiers du Québec* has produced several awareness-raising brochures and best practice guides for owners of private forest lands, to increase awareness on the importance of conservation actions[24]. Few of the properties in the current audit have been subject to an ecological survey that could set the ecological value of the forests and/or the actions date, PIVOT is contributing through their instances to implement to maintain those values and the protection of the habitat of 17 different species at risk.

[22] Un Plan Sud pour le Québec – Livre Blanc pour la protection de la biodiversité au sud du 49e parallèle ; https://livreblanc.ca/

[23] Un Plan Sud pour le Québec – Livre Blanc pour la protection de la biodiversité au sud du 49e parallèle ; https://livreblanc.ca/

[24] https://www.foretprivee.ca/je-protege-ma-foret/conservation-de-milieux-sensibles/ https://www.foretprivee.ca/je-protege-ma-foret/conservation-de-milieux-sensibles/

The modification of forestry practices in Pivot instances do not have any negative impact on the jobs and/or incomes of local communities. In the case of the Municipalities, there have been no changes in taxation, and there is no loss in tax revenue with the changes proposed.

In most of the province of Quebec, commercial forestry harvesting work is carried out by forestry companies, which are most of the time directly hired by forestry advisors. The forestry workforce in Quebec has been affected by a major shortage for several years[25], there is a lack of forestry contractors everywhere. Forestry entrepreneurs mention high labor mobility and a shortage as well as difficulty in recruiting[26]. Moreover, 58% of the forestry companies consider that they had more difficulty filling positions in 2020 compared to previous years[27]. This need is so pressing that the Coaticook Professional Training Center (CRIFA) launched at the beginning of 2024, a new training program aimed at training new forestry workers[28].

In the case of forestry advisors, the Pivot Project itself generates new opportunities for forestry workers both on the field and in the development of new technology tools. The monitoring and forest inventories necessary in Pivot are carried out by the aggregator, who is the forest advisor.

2.2 Local Stakeholder Consultation

As part of the integration process for the first group of instances as well as for any new instance, a local stakeholder consultation process is required. This process allows the project team to inform aggregators and participants about the rights and responsibilities of each of the project parties as well as to train them on the operational procedures related to the integration and future monitoring.

The consultation process is also an important tool to establish communication channels between parties as well as to detect any significant change in the laws and regulations covering the project implementation or workers' right in the province or any information related to changes in the external and/or internal risks of the project or the instance.

In general, up until now, there have been no changes in the projected benefits of the project, nor in the laws and regulations covering the project. Neither ECOTIERRA, the aggregators or the participants have

[25] La Foresterie en manque de main d'œuvre, article du 21 octobre 2018 dans La Tribune, consultée le 31 janvier 2024, https://www.latribune.ca/2018/10/22/la-foresterie-en-manque-de-main-doeuvre-418da78d51e99acce5ca608852743b44/ .

[26] Portrait des entreprises de récolte de bois en Estrie, Agence de mise en valeur des forêts privées de l'Estrie (septembre 2017), consulté le 31 janvier 2024,

[27] Diagnostic sectoriel de main d'œuvre de l'industrie québécoise de l'aménagement forestier 2020-2021, ForêtCompétences, consultée le 31 janvier 2024, https://foretcompetences.ca/uploads/diagnostic-sectoriel-2020-2021.pdf

[28] La Foresterie en manque de main d'œuvre, article du 21 octobre 2018 dans La Tribune, consultée le 31 janvier 2024, https://www.latribune.ca/2018/10/22/la-foresterie-en-manque-de-main-doeuvre-418da78d51e99acce5ca608852743b44/ .

indicated any issue affecting the external and internal risks related to carbon permanence or project implementation.

Also using these communication channels, all participants and aggregators of the new instances have been informed by email and telephone about the verification visit that will be carried out by AENOR in the last quarter of 2022.

In particular, the consultation process has been implemented as follows.

A) Forêt Hereford (FHI)

In the case of FHI, owner of the Hereford Community Forest, an advisory committee was set up in 2016 to define the new zoning of the territory. This new zoning proposed different options for the implementation of carbon credit zones, based on the needs and objectives of different stakeholders. The members of this advisory committee, composed by near thirty people, including elected officials and employees of the municipalities of East Hereford and Saint-Herménégilde, stakeholders and representatives of user groups, were invited for two meetings (27-02-2017 and 08-05-2017), to participate in the zoning process. As a result of this process, a zoning plan and a five-year action plan were submitted for public consultation by Hereford Forest to its members by e-mail in the summer of 2017 (this document is available on the Website of FHI)[29].

Since then, the members of the Conservation Board, the Users Board and the Board of Directors of the Hereford Forest have been continuously involved and informed on the implementation of the PIVOT project in the areas owned by FHI. Both the Conservation and the Users Boards have regularly two meetings per year. The Board of Directors regularly meets 7-8 times a year and the implementation process of PIVOT is part of the agenda in almost every meeting. Also, a project Steering Committee, that includes two representatives from ECOTIERRA and two from FHI has been set up in 2016, the board Ecotierra and FHI Boards of Directors. Meetings are planned and held according with the needs of the project[30].

In all the meetings held to date, a space was given to respond to concerns about the project. As an example, one of question was how FHI would be involved in the credit marketing process. The answer to

[29] https://www.forethereford.org/fr/a-propos/documents/Rapport-Foret-Hereford-volet-portraits-zonage.pdf , consulted in January 2023. https://www.forethereford.org/fr/a-propos/documents/Rapport-Foret-Hereford-volet-portraits-zonage.pdf , consulted in January 2023.

[30] A summary of all the meetings with FHI is available at \FHI_2017_ERA_001\Public information\Rencontres_Échanges_FHI_Ecotierra_Pivot or \FHI_2017_LtPF_001\Public information\Rencontres_Échanges_FHI_Ecotierra_Pivot

this question was: “In order to ensure flexibility and agility, ECOTIERRA and FHI agree on certain grand criteria for selecting credit applicant” All questions and answers are evidenced in the Excel file “Rencontres_Échanges_FHI_Ecotierra_Pivot”.

Between 2017 and 2022, PIVOT panels have been installed in different places in the Hereford Community Forest to inform the public of the existence of the project, the location of the participating areas, as well as the objectives of the project. This information has been also published several times in the municipal newspapers[31].

The annual and five-year forest management plans clearly present and define the areas included in PIVOT. The *Groupement forestier des Cantons*, who is in charge of the forestry operations in Foret Hereford, uses the information of this plan and the corresponding shapefiles in its day-to-day operations when planning their forest management activities.

B) Corridor Appalachien (ACA)

Since 2017, several meetings have been held between Ecotierra and the members of the Board of Directors. Since the registration of the Project (May 2021), ACA and Ecotierra have had several working workshops with the participation of their management and technical teams as well as its Board of Directors.

In the final stages of the inclusion process, two PIVOT-related technical training courses were organized in the fall of 2021 for ACA employees and administrators (22-10-2021 and 08-12-2021).[32]

In all the meetings held to date, a space was given to respond to concerns about the project. As an example, ACA team had “how do I protect ACA's reputation when selling Pivot credits?”. The answer to this question was: “The reputation of the credit buyers is as important as that of the participants. It will be specified in the Agreement that Pivot credits cannot be sold to extractable companies (gas, mining or oil) and for others: they must demonstrate that they have an internal approach to reducing their climate impacts and that compensation is their ultimate solution”. All questions and answers are evidenced in the Excel file “Rencontres_Échanges_ACA_Ecotierra_Pivot”.

[31] Copies of the publications are available at \Annex\ General Public_information
[32] A summary of all the meeting with ACA is available at ACA_2021_ERA_002\Public consultation Rencontres_Échanges_ACA_Ecotierra_PivotLELM or at ACA_2021_LtPF_002\Public consultation Rencontres_Échanges_ACA_Ecotierra_PivotLELM

C) Société de Conservation du Mont Brome (SMB)

Discussions with the directors of the Société de conservation du Mont Brome started in January 2017 with several technical meetings organized between Ecotierra and their team. Presentations were made to their Board of Directors and to elected officials of the City of Bromont (16-02-2021, 29-03-2021, 31-01-2022).

Ecotierra and the PIVOT team were invited at least twice during the public meetings of the Municipal Council of the City of Bromont (these meetings included participation of the public) (07-02-2022 and 12-09-2022).[33] This process and the partnership between the Société de Conservation du Mont Brome, the City of Bromont and PIVOT were published in local newspapers[34]. A summary of all the meetings is presented[35].

In all the meetings held to date, a space was given to respond to concerns about the project. As an example, one of question was “can new recreational trails be built in Pivot areas?”. The answer to this question was: “Yes, it is possible to build recreational trails but with a right of way of 1.5 m or less. The guidelines have been sent to Friends of the Trails.” All questions and answers are evidenced in the Excel file “Rencontres_Échanges_SCMB_Ecotierra_Pivot”.

2.3 AFOLU-Specific Safeguards

The project is mostly undertaken on privately owned land in Quebec, where conflicts over land ownership and rights are almost inexistent, as a well establish land-tenure system exists. Under these circumstances, no approval from local community members is required and no compensation mechanisms are required.

A) Forêt Hereford Inc. (FHI)

FHI is the only owner of the Hereford Forest, were instances FHI_2017_ERA_001 and FHI_2017_LtPF_001 are located. Those instances are in private land with no other previous instances participating in PIVOT.

[33] A summary of all the meetings is available in: SMB_2022_LTPF_003\Public consultation
[34] https://www.lavoixdelest.ca/2022/02/09/bromont-pionniere-dans-le-marche-des-credits-carbone-11a77c169592e7d65d8a0017ce2014e7) and in the municipal newspaper of the City of Bromont .
[35] A summary of all the meetings is available in: SMB_2022_LTPF_003\Public consultation

FHI employees and volunteers ensures that private ownership of the community forest is always respected. Since its creation, Forêt Hereford has provided free pedestrian access to certain areas with several hiking trails. Signs have been installed in fall 2022, at each entrance of trails, to explain the goals and implementation process of the project, while several other panels already present the project to the visitors in different locations.

Hunters, members of the Hereford Fish and Game Club, as well as mountain bikers have regulated access to defined project areas, following their zoning plan. Mountain bikers have access to the project area with several biking trails maintained by a non-profit partner (Circuits Frontières). To ensure that there will not be negative impacts of the project for the community, all the different stakeholders have been part of the selection of the areas to be included in PIVOT (by participating in the Consultative Committee). All the parties aggreged with the zoning as the proposed activities to be implemented under do PIVOT would not have any negative impacts. That is on their own activities. This approval was a key element for the final decision of FHI Board of directors Directors to participate on the project. FHI, as the only owner of the forest lands, is the only stakeholder affected, as the volume and flow of harvested timber over time will very, reducing the annual allowable cut and the annual incomes. Nevertheless, this is compensated with new revenues from carbon offsets sales. Additional information on the consultation and communication process can be found in Section 2.2. Finally, as well as links to several media publications related to the consultation process.

B) Corridor Appalachien (ACA)

ACA is the only owner of the lands of instances ACA_2021_ERA_002 and ACA_2021_LTPF_002. Both instances are in private lands with no other instances participating in PIVOT.

As the only owner of these properties, ACA is the only stakeholder concerned and affected with the inclusion of their lands in the Project. In the case of ACA, public access to the Mont Foster part of instance ACA_2021_LTPF_002 will be preserved with the new hiking trails managed by ACA itself. ACA will maintain trails that are part of a network of 4,5 km which connects to the Eastern Townships' trails in the southern portion of their lands, including a 9,75-meter-high observation tower located at an altitude of 710 meters.

C) Société de Conservation du Mont Brome (SMB)

The city of Bromont is the only owner of the lands part of instance SMB_2022_LTPF_003. This instance is located in private land with no other previous instances participating in PIVOT.

The stakeholders concerned by the PIVOT activities in this instance are the City de Bromont (owner), the SMB (aggregator and responsible of the ecologic monitoring of the properties) and *Les Amis des Sentiers de Bromont* (non-profit organization in charge of the development and the maintenance of the trails network in the properties). As part of the integration process of the instance to PIVOT, SMB and the City of Bromont created a vast offer of activities open to the public that includes most of the areas part of instance SMB_2022_LTPF_003.

During the integration process, different questions and concerns from the owner and the aggregator were responded in the meetings listed in Section 2.2. No concerns were raised from Les Amis des Sentiers as their maintenance activities are not affected by the project activities. The three stakeholders meet several times each year to share information about the stewardship of the concerned properties.

This instance includes trails that are part of a 140 km network of trails in the Sommets property (now Parc des Sommets), including belvederes and picnic tables in strategic areas, allowing visitor to enjoy the newly protected areas. Also, Mount Oak offers a multitude of routes for mountain biking, from young families to top experts. With a total of 17 km of trails interconnected and developed to highlight the natural features of this forest.

Access to these trails are free for Bromont residents. Non-residents of Bromont will pay a fee that is donated to *Les Amis des Sentiers,* responsible for the maintenance of the trails and the sustainability of the network in Bromont by seeing to their protection and development.

PIVOT is working SBM and ACA for the installation of panels and signs at each entrance of trails, to explain the goals and implementation process of PIVOT. Also, many articles have been locally published to inform the population (see the public information[36]).

Finally, as described in the eligibility report of the instance, new revenues generated by the carbon credits will contribute directly to the stewardship of the easements. To date, the City of Bromont has agreed to contribute 50% of the value of the stewardship fund, while the SMB will use carbon revenues to cover part of the missing funds. The SCMB therefore faces a real daily challenge to finance the stewardship of the properties and the maintenance of the permanence of the conservation.

[36] see PROGRES FORESTIER_ETE 2021 and Projet Pivot_Progres_Forestier_spring22\Annex\General Public_information

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The monitoring period is defined between 1-January-2018 and 18-July-2022 for both instances under verification. PIVOT has been implementing monitoring activities over the existing instances and concentrate its efforts in increasing awareness on the benefits of the project for forest owners and aggregators. During this period, the project has integrated 3 new instances with a total of 1,430.6 ha under LtPF and 535.2 ha under ERA activities. Table 7 shows a summary of the implementation status per aggregator and instance.

Table 7. Implementation summary

Aggregator	Instance	Activity	Eligible Area (ha)	Event
Forêt Hereford (FHI)	FHI_2017_ERA_001	Extended Rotation Age / Cutting Cycle (ERA)	133.6	Verification
Forêt Hereford (FHI)	FHI_2017_LTPF_001	Logged to Protected Forest (LtPF)	664.9	Verification
Corridor Appalachien (ACA)	ACA_2021_LTPF_002	Logged to Protected Forest (LtPF)	509.4	Validation
Corridor Appalachien (ACA)	ACA_2021_ERA_002	Extended Rotation Age / Cutting Cycle (ERA)	401.6	Validation
Société de conservation du Mont Brome (SMB)	SMB_2022_LFPT_003	Logged to Protected Forest (LtPF)	256.3	Validation

During this monitoring period, and since the beginning of the project, no ARR activities have been implemented.

Instances under Verification

A) Forêt Herford (FHI)

Instance FHI_2017_ERA_001

FHI integrated 142.0 ha to this instance as part of the project first group of instances. In year 2022, as part of the quality control process before the forest inventory, 8.4 ha were put aside due to eligibility issues (mainly wetland), at the same moment due to an update of Quebec's cadastral boundary system, the boundaries of some parcels conforming the instance were slightly modified, adding areas and /or reducing areas depending on the data provided by the government, finally a third source of change was due to having access to better data from LIDAR related to watercourses, (now available for

the entire province of Quebec), with slight changes in total areas. The update of the provincial cadastral boundary system started in 1983 and will be finished in 2023[37].In the case of FHI, the final version was available in 2018. No further issues related to boundaries are expected after this update.

The document "« **FH_Changements_Superficie_2018_2022 [38]»** present the Origin of Changes in the area of FHI Instances (2022-08-18). After these changes, the project started the monitoring of forest growth with a total of 133.6 ha and using the adjusted baseline defined with data generated in January 2018.

For this monitoring period (1-January-2018 to 18-July-2022), forest harvesting activities have not been carried out in this instance and not emissions were registered. The field data collection and processing for the first monitoring report took place between June 13th and July 18th 2022.

Following the monitoring procedures of the project, annual monitoring of the below mentioned activities was implemented with the following results.

- Pre-commercial and/or commercial harvesting: As part of the project implementation, harvesting cycles were extended to 30 years in comparison with pre project cycles of 15 years. The next harvesting activity in this instance is planned for year 2038. Therefore, no pre-commercial or commercial harvesting activities or other types of harvesting activity have been carried out in this instance over this monitoring period. Forestry activities were carried out near the boundaries of the instance in 2018, 2019 and in 2021. To avoid undesired activities inside the instance boundaries, even if flags on the field identify the limits of the carbon offsets zones, each worker was provided with a GPS and the need of awareness of the boundaries was requested during training.
- Harvesting of wood for non-commercial purposes: In the case of harvesting of wood for non-commercial purposes, no harvesting of this kind is allowed, During the monitoring period no non-commercial harvesting was reported. Recreational trails (mountain biking) crossing this instance were maintained in a regular basis in 2018, 2019 and 2020, with some trees felled for security purposes and left in place.

[37] https://www.quebec.ca/habitation-et-logement/information-fonciere/cadastre/renovation-cadastrale

[38] Annex II. FH_Changements_Superficie_2018_2022 available in folder « Annex »

- Extreme weather and pest / diseases: Over the last 5 years and since the project started, there have not been occurrences of extreme weather events or outbreaks of pests and/or diseases.

Instance - FHI_2017_LTPF_001

FHI integrated, in 2017, 686 ha to this instance as part of the project first group of instances. In year 2022, as part of the quality control process before the forest inventory, 12.5 ha were put aside due to eligibility issues (mainly wetlands). At the same moment due to an update of Quebec's cadastral boundary system[39], the boundaries of some parcels conforming the instance were slightly modified, adding areas and /or reducing areas depending on the data provided by the government, finally a third source of change was due to having access to better data from LIDAR related to watercourses (now available for the entire province of Quebec), with slight changes in total areas.

A particular case affected parcel 5 of this instance, where 0.32 ha were retired voluntarily by FHI due to the extension of an existing parking lot (due of the Covid crisis).

Considering these elements, the project started the monitoring of forest growth with a total of 664.9 ha, using the adjusted baseline defined with data generated in January 1st, 2018.

For this monitoring period (1-January-2018 to 18-July-2022), forest harvesting activities have not been carried out in this instance and not emissions were registered. The field data collection and processing for the first monitoring report took place between June 13th and July 18th, 2022.

Following the monitoring procedures of the project, annual monitoring of the below mentioned activities was implemented with the following results.

- Pre-commercial and/or commercial harvesting: No pre-commercial or commercial harvesting activities or other types of harvesting activity are allowed in this instance since its inclusion in the project. Forestry activities were carried out near the boundaries of the instance in 2018, 2019 and in 2021. To avoid undesired activities inside the instance boundaries, even if flags on the field identify the limits of the carbon offsets zones, each worker was provided with a GPS and trained on the need of awareness of the carbon parcel boundaries.

[39] This has been a 20 years process that is already finished and we don't expected any new issues related to this in the future. https://www.quebec.ca/habitation-et-logement/information-fonciere/cadastre/renovation-cadastrale/a-propos

- Harvesting of wood for non-commercial purposes: No harvesting of wood for non-commercial purposes is allowed in this instance and only harvesting for sanitary reasons could be justified. No harvesting was reported for this monitoring period. Recreational trails crossing the instance were maintained in a regular basis in 2018, 2019, 2020, 2021 and 2022, with some trees felled for security purposes and left in place. As mentioned before, an adjustment in parcel 5 of this instance was made to subtract an area assigned to expand the parking zone adjacent to the conservation area to comply with COVID 19 measures.

- Extreme weather and pest/diseases: Over the last 5 years and since the project started, there have not been occurrences or extreme weather events or outbreaks of pests and/or diseases.

Instances under Validation for inclusion

The process of including the instances under validation comprised the following stages.

1) Recruitment and training of the aggregator (one time only)

At this stage the Memorandum of Understanding between ECOTIERRA and the aggregator is signed, and a Due diligence is carried out by the professional involved and reported by ECOTIERRA. Once these documents are signed, the following training courses are given by ECOTIERRA to the aggregator's team involved:

- Training 1 (operation and activities)
- Training 3 (Participation Agreement): approximately 3.5 hours.
- Training 2 (Forest inventories): 2 capsules (about 30 min) online with specific instructions.

If the aggregator finishes the 3 courses, ECOTIERRA gives a certificate to the aggregator a certificate.

2) Eligibility assessment for Inclusion of new plots

The first phase includes the signature of the documents of Prior considerations and preparing the documentation on the history of forest management or on the risks of loss of forest cover for each property (PAF, etc.). In this phase the participant and aggregator must transmit the land titles to ECOTIERRA. Additionally, the new participant must demonstrate the need for carbon credit revenue in the financing package for acquisition and/or stewardship, besides filling out the Eligibility questionnaire (about 30 questions).

With the georeferenced information of the areas sent by the aggregator, ECOTIERRA proceeds to carry out:

- The verification of municipal regulations concerning tree harvesting,
- Exclusion of areas with a conservation status
- Exclusion of certain areas not to be included in Pivot.

- ECOTIERRA removes the wetlands and the non-eligible zones based on Ecoforest Information System (*Systeme d'information ecoforestier,* SIEF) and prepares a draft of Eligibility Assessment Report and the document of preliminary engagement.

3) Preliminary commitment

In this step, a final choice of the activity is taken place and with this, the signature of the Preliminary commitment (assessment of cost-income for the instance, next steps, etc.) and presentation of the Aggregator's general service offer to the participant.

4) Baseline adjustment

This step implies a forest inventory work in the field (Garmin GPS, tape measure, forest compass, Kizeo application), data processing work and its report. Then, a signature of Participation Agreement, one per participant.

	Corridor Appalachien (ACA)		Société de conservation du Mont Brome (SMB)
Document	**ACA_2021_LTPF_002**	**ACA_2021_ERA_002**	**SMB_2021_LFPT_003**
Memorandum of Understanding between ECOTIERRA and the aggregator (*Protocole d'accord entre ECOTIERRA et l'agrégateur*)	01/10/2021	01/10/2021	07/03/2021
Prior considerations (*Considérations préalables*)*	Brisebois-Suprenant 13/12/2017 Collins 13 /12/ 2017 SIFISA 15/05/ 2018 Mont Foster 17 /12/2019 Nadeau 4/12/ 2019	9/05/2021	02/24/2022
Eligibility questionary (*Questionnaire d'éligibilité*)	24/11/2021	24/11/2021	08/03/2022
Preliminary commitment (*Engagement préliminaire*)	01/06/2022	01/06/2022	22/04/2022
Participation agreement (*Convention de participation*)	29/08/2022	29/08/2022	29/08/2022

*This document it is not mandatory to be signed.

Leakage and Non-Permanence

With no deviation from historical trends, there is no activity shifting leakage related to FHI instances. Market leakage analysis was updated to include changes in the areas of instances FHI_2017_ERA_001 and FHI_2017_LTPF_001, results are presented in section 5.3 of this document.

In relation to non-permanence issues, following the procedures of the non-permeance risk tool and the monitoring plan, there have not been natural events in Forêt Herford that could have increased any natural risks score or could have affected the permanence of sequestered carbon and/or the internal or external risk of the project.

3.2 Deviations

3.2.1 Methodology Deviations

There were no methodology deviations during this monitoring period.

3.2.2 Project Description Deviations

Adjustment of areas for instances FHI_2017_LTPF_001 and FHI_2017_ERA_001.

At the project registration, this first group included 828 ha from FHI. This area was adjusted to 798.5 ha, this change was related to the results of the Quebec's provincial government updated on its cadastral boundary system as it is explained in section 3. Additionally, as part of the quality control process before the forest inventory, 8.4 ha were put aside due to eligibility issues (mainly wetland). The final area of these instances is: 133.6 ha for instance FHI_2017_ERA_001 and 664.9 ha for instance FHI_2017_LTPF_001 (see section 3 for more details).

As it was mentioned before, the document "« Annex II FH_Changements_Superficie_2018_2022[40] » presents the Origin of Changes in the area of FHI Instances (08-18-2022). The original and modified shp could be found in the SIG file of each instance. It is important to highlight that the exclusion is not the result of land use change, leaks or another reason that puts in danger the permanence of the project. This deviation does not affect the methodology, the baseline, or the additionality, it only affects the ex-ante emission reduction calculations.

Fallowlands (*Friches*) and Agricole's fields (*Champs agricoles*) definition

In the Project Description document, the definition of *friche* was as follows "vegetation system resulting after the discontinuation of agricultural practices. For the project, land that has not been cultivated at least over the last 5 years is considered as *friche"*.

This definition is established as an eligibility criterion for areas where the ARR activity will be implemented. However, the original definition does not evidence the reality and dynamics of the *friches* in Quebec. This definition restricts the participation of several owners in the project since the *friches* are not only abandoned land in the agricultural sector but also land destined for other uses such as abandoned golf courses, industrial land areas, etc. In this sense, to allow a broader participation of owners and improve the impact of the project in mitigating climate change and sustainability, the following extended definition is proposed:

[40] Available in: Annex\Annex II. FH_Changements_Superficie_2018_2022

"Land eligible as *friche* consists of land, that use to be under anthropic use (agriculture, industrial, urban, recreational, etc.), whose primary use has ceased recently or for a few years, which is awaiting new occupation or remediation, but without a clear timeline. It can be in the herbaceous stage (young or old) or shrubby, but without the significant presence of saplings of tree forest species." This deviation does not affect the methodology, the baseline, or the additionality, because new types of abandoned lands will have the same alternatives scenario of agriculture follow lands (*friches*).

Data and parameters monitored that were updated or deleted.

- **Height of small trees (Hst):**

The biomass allometric equations being used for the determination of carbon content in small trees do not require this data as a variable, therefore it is not necessary to collect this information as part of the field inventories. This deviation does not affect the methodology, the baseline, or the additionality or even the final calculations because two different allometric equations have been compare and the most conservative result was chosen.

- **Top diameter of standing dead wood / stump, diameter of standard lying dead wood pieces or deep of accumulation / irregular dead wood pieces (D_{DWS})**

This parameter has been replaced by D_{MID_STUMP} (mid-height diameter of the dead tree stump). This change was made following AR-TOOL12 of CDM[41] for the quantification of carbon content in deadwood, stumps measured and recorded in the forest inventory are in all cases tree stump with height below 4 m, where the needed parameter for the calculation is mid-height diameter. This deviation does not affect the methodology, the baseline, or the additionality or even the final calculations because the original parameter as well as the new one is considering the same diameter measures.

- **The fraction of the dry mass of wood, excluding bark, that is carbon (fC,wood) and Carbon fraction of tree biomass (CF)**

The monitoring section of the PD mentions the use of two different carbon fractions. PIVOT will only be considering CF,wood (0.5) to calculate the fraction of carbon in each of the pools for baseline and project emissions. fC will be omitted to avoid confusion in the process. This deviation does not affect

[41] Estimation of carbon stocks and change in carbon stocks in dead wood and litter.

the methodology, the baseline, or the additionality or even the final calculations because both parameters have the same value.

- Long-Term Average

The project document validation followed the VCS standard V.5, and this document stated that "the ARR and IFM projects with harvesting activities shall not be issued GHG credits above the long-term average GHG benefit maintained by the project". Therefore, all GHG emissions removals/reductions was calculated considering the Long-Term average. However, in the new version of this document (VCS standard V4.4) states that "where ARR and IFM projects meet or exceed the harvesting activity definition, the long-term average shall be applied." In this sence, the VCS Program definitions V4.3 has been followed to determine if there is harvesting in the instances under ERA activity, according to this document harvesting activity is defined as the harvest of trees, vegetation, or other biomass, which results in a reduction by more than 20% of carbon stocks over a five-year period that starts when a reduction of carbon stocks occurs. In the case of grouped projects, the 20% threshold applies to each project activity instance. Therefore, this definition was taken into account and analyses of harvesting was carried out in section 5.4.1, specifically, the Table 92 presents the analysis of the viability of the application of the LTA in FHI_2017_ERA_001. The result of this analyse indicates that the timber extraction over a five-year periode in the the FH and ACA Instance, don't meet the harvesting definition.

This deviation does not affect the methodology, the baseline, or the additionality. This deviation affects the final calculations for IFM activities due to in the FHI's ex-ante calculations the long-term average was considered because the VCS standard V4.5 was followed.

3.3 Grouped Projects

Three new instances were included in the project since the project start date, two from Corridor Appalachian and one from Société de Conservation du Mont Brome. The first step in the process of including these instances into the project is the eligibility questionnaire[42] designed by ECOTIERRA for this purpose. Along with the questionary, the owner must attach the shape file of the parcel, the management plan and property titles. The list below includes the criteria analyzed in the eligibility process:

[42] 7.3 Rapport_éligibilité_ACA_2021-ERA-002 available in: ACA_2021_ERA_002\Elegibility Analyse - 7.3 Rapport_éligibilité_2021-LtPF-002 available in : ACA_2021_LTPF_002\Elegibility analyse - 7.3 Rapport_éligibilité_2022-LtPF-001 available in: SMB_2022_LTPF_003\Elegibility Analyse

- Type of activity in which you want to participate.
- Number of areas to integrate.
- Availability of property titles.
- Current land use.
- Responsible for project implementation.
- Financial feasibility of the activity.
- Location of the parcels to be included on the project (administrative and geographical location, map of the area).
- Expected beginning of project activity.
- For ARR projects, origin of the propagation material.
- For ARR project, justification of how they meet the definition of *friche.*
- For ARR project, justification that the area has not been forest over the last 10 years.
- The area to be included in IFM activities meets the definition of forest.
- The area to integrate is not defined as an exceptional ecosystem.

The inclusion process for each new instance as well as the ex-ante estimation of the emission reduction to be generated after the baseline adjustment is described below.

Eligibility assessment for new instances.

The following eligibility conditions from the methodology VM0034 have been evaluated and demonstrated for each new instance:

3.3.1.1 Instances

Corridor Appalachien – Instance ACA_2021_LTPF_002

ACA is a recognized aggregator of the project and as a large owner with a team of professionals with significant experience in forest conservation and project administration, it plays both the role of aggregator and participant. This LtPF instances in conformed by five parcels, consisting essentially of stands of tolerant hardwoods, composed mainly of maples, and to a lesser extent of birches and firs. All parcels assessed for eligibility have undergone forestry interventions in the past, being in accordance with the baseline established in PIVOT.

The aggregator showed its interest in placing under the selected areas under conservation (LtPF) in the eligibility analysis (see "*7.3 Rapport_éligibilité_2021-ACA-ERA-001*" for mor details), signing the Prior Considerations format, before the acquisition of these properties. A first meeting with the Board of Directors and ECOTIERRA took place on November 3, 2017, and from that moment, the aggregator

began to integrate future carbon credit revenues into the financial package for the acquisition and stewardship of coveted lands.

After the stratification of the instance, 28.2 ha were rejected, as they didn't comply with the definition of forest under the project (forest cover and land use information provided by the Quebec's Forestry Ecological System (*Système d'information écoforestière, SIEF*)) or for being classified as wetlands (non-forest). The final eligible area for this instance is 509.4 ha.

Table 8. Date of prior consideration and acquisition of each property of ACA_2021_LTPF_002

Property name	Date of Prior Considerations	Lots	Owner of the lot	Proof of property or possession
Brisebois-Suprenant	December 13, 2017	5192036; 5662873 5035863 51916629 5191553; 6351070; 6351071	ACA	Notarial deed of sales Brisebois (Available in: ACA_2021_LTPF_002\Legal Documents\Land titles)
Collins	December 13, 2017	5193272; 5192036; 5662872; 5662873	ACA	Notarial deed of sales Collins
SIFISA	May 15, 2018	5035863	ACA	Notarial deed of sales SIFISA (Available in: ACA_2021_LTPF_002\Legal Documents\Land titles)
Sud Participation (Mont Foster)	December 17, 2019	51916629	ACA	Notarial deed of sales Mont Foster (Available in: ACA_2021_LTPF_002\Legal Documents\Land titles)
Nadeau	December 4, 2019	5191553; 6351070; 6351071	ACA	Notarial deed of sales Mont Foster (Available in: ACA_2021_LTPF_002\Legal Documents\Land titles)

The field work was carried out between October 26 to November 5, 2021[43], however, the start date of this instance is 19-07-2022 , date when the data processing and modeling were finished.

Ex-ante calculations show 175,305[44] (tCO_2e) net GHG emissions reductions or removals will be generated during the project crediting period.

Corridor Appalachien - ACA_2021_ERA_002

ACA also integrated the Khartoum property to PIVOT under ERA activities in 2021. The forests of these parcels have similar species composition and age structure as the LtPF instance and have also undergone forestry interventions in the past.

Corridor Appalachien demonstrated its intention of change its baseline practices signing the Prior Considerations format on April 9, 2021, while the official inclusion was made on April 19, 2021. The Aggregator subsequently signified its interest in placing under rotational extension the plots submitted.

Table 9. Date of prior consideration and acquisition of each property of ACA_2021_ERA_002

Property name	Date of Prior Considerations	Lots	Owner of the lot	Proof of property or possession
Khartoum	April 9, 2021	2457078,	ACA	Notarial deed of sales - Khartoum-Simard (Available in: ACA_2021_ERA_002\Legal Documents\Land Titles)
		2236062,	ACA	
		2457092,	ACA	
		2457318,	ACA	
		2457322,	ACA	
		2457323,	ACA	
		2457324	ACA	

The property was subjected of a forest management plan (PAF), carried out on behalf of the previous owner. In the context of eligible activities in the Pivot Project, the approach would be to postpone the planned selective cutting (30% removal) for 15 years when the stands or groupings of stands would be

[43] See file "ACA Baseline adjustment_Draft ENG" available : 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\BL_ACA_2021_ERA_002

[44] See file cell L127 of sheet "Balance LtPF " of the file "Calculs_Net_VCU_ACA_ERA_LtPF_adjusted.xls@ availabe in INCLUSION CARs\ACA_2021_LTPF_002\BL_ACA_2021_LtPF_002

eligible for it based on dendrometry data (minimum basal area of 24 m²/ha in the Guide Sylvicole du Québec). Invasive non-tree species are present in small quantities and will be subject to control attempts by the participant: reed (several species), japanese knotweed (Fallopia japonic), glossy buckthorn (Frangula alnus, syn.) and european buckthorn (Rhamnus cathartica). The activities proposed by PIVOT will contribute to the control of these species, by reducing the opening of the forest cover.

After stratification of the instance, 40.5 ha are rejected, as they didn't comply with the definition of forest under the project (forest cover and land use information in the Quebec's Forestry Ecological System (Système d'information écoforestière, SIEF) or for being classified as wetlands (non-forest). The total area eligible for the instance is 401.6 ha.

Ex ante calculations shows that 132,529 45 (tCO2e) net GHG emissions reductions or removals will be generated during the project crediting period ACA_2021_ERA_002.

Société de conservation du Mont Brome – SMB_2022_LTPF_003

La Société de conservation du Mont Brome has included 256.3 ha under conservation activities. The forests of this instance consist essentially of stands of tolerant hardwoods, composed mainly of hardwoods (maple and birch), and to a lesser extent of spruce, fir and other noble hardwoods. The polygons (in Shapefile format) of the parcels assessed have undergone forestry interventions by previous owners. These interventions are coherent with the baseline established in the PIVOT Forest Project.

Details on the eligibility analysis can be found in the eligibility report (7.3 Rapport_éligibilité_Bromont_2022-LtPF-003001). Discussions with this Aggregator about the intention of participating in PIVOT project began in 2017, before the first land acquisitions. On January 19, 2018, the Mount Brome Conservation Society signed the Prior Considerations formats to initiate the process of inclusion in PIVOT under LtPF activities. However, the aggregator waited until the official registration of the Project PIVOT under VCS to conclude the inclusion process.

By signing the Prior Consideration form, they renounced to future timber harvesting revenues, which would have been a possible source of income for the manager and the owner. The new revenues generated by the carbon credits will thus contribute directly to the stewardship of the easements and may contribute to the development of access, education, and conservation activities.

Strategically, any stewardship project includes an endowment fund representing at least 15% of the land value. To date, the City of Bromont has agreed to contribute 50% of the value of this fund, while the aggregator must generate income or raise funds to cover fund gap. SMB therefore will use the income from carbon credits to contribute to finance the stewardship and secure the permanence of the conservation. In addition, the conservation easement signed a posteriori also reinforces the permanent character of the carbon credits.

[45] see file cell L126 of "Balance ERA " of "Calculs_Net_VCU_ACA_ERA_LtPF_adjusted.xls availabe in NCLUSION CARs\ACA_2021_ERA_002\BL_ACA_2021_LtPF_002

The deeds of transfer of properties and deeds of conservation easement were signed between the months of March 2018 and February 2022, after the signature of the prior consideration forms, and is coherent with the additionality analysis, essential to participate the project. On March 9, 2019, ECOTIERRA published a first preliminary eligibility report on the first four properties held by the City of Bromont (Sommets, Pépin, Émond, Accolas).

Table 10. Date of prior consideration and acquisition of each property of SMB_2022_LTPF_003

Property name	Date of Prior Considerations	Lots	Owner of the lot	Proof of property or possession
Sommets	January 19, 2018	5088506, 5088507, 5903433, 6021107, 5370669, 5918106, 6021105, 4056640, 5496266, 6021768, 6021770, 6347488	Ville de Bromont	Certified statement of legal registration in the land register of Quebec (see: servitude conservation légale 20180405-V2_Proprieété Parc des Sommets. Available in: SMB_2022_LTPF_003\Legal Documents\Mont_Brome_titles)
Émond	January 19, 2018	2929398, 2929367, 2929366, 2929407, 2929372, 6152017, 6152018, 6153510,	Ville de Bromont	Conservation agreement between mont brome conservation society and city of bromont (see Entente de conservation entre VDB et SCMB copie 53ignee_Propriété Pépin et Émond available in: SMB_2022_LTPF_003\Legal Documents\Mont_Brome_titles)
Pépin	January 19, 2018	6122934 , 6122935	Ville de Bromont	Conservation agreement between mont brome conservation society and city of bromont (see Entente de conservation entre VDB et SCMB copie 53ignee_Propriété Pépin et Émond available in: SMB_2022_LTPF_003\Legal

				Documents\Mont_Brome_titles)
Accolas	January 19, 2018	6 352 013	Ville de Bromont	Certified statement of legal registration in the land register of Quebec. (See Acte notarié – Propriété Accolas,available in: SMB_2022_LTPF_003\Legal Documents\Mont_Brome_titles)
Mont Oak	January 19, 2018		Ville de Bromont	Transfer notice. See Titres_Mont_Oak available in (SMB_2022_LTPF_003\Legal Documents\Mont_Brome_titles)

Ex ante calculations show that 82,57546 (tCO2e) net GHG emissions reductions or removals will be generated during the project crediting period by instance SMB_2022_LTPF_003.

3.3.1.2 Projects must be located within Canada.

All plots belonging to these instances are in the province of Quebec and inside the potential project area defined in the PD.

- Figure 4.shows the location of each plot belonging to instance ACA_2021_LTPF_002
- Figure 5. shows the location of each plot belonging to instance ACA_2021_ERA_002
- Figure 6. shows the location of each plot belonging to instance SMB_2022_LTPF_003

3.3.1.3 Projects must be located in one of tree strata of the potential project area.

This stratification was defined according to the Quebec's ecological sub-zones classification (continuous boreal, mixed and deciduous forests). In the case of the continuous boreal forest stratum, it includes the southern part of the continuous boreal forest ecological sub-zone, up to the border between the *balsam fir white birch* and *spruce-moss* forests, for the other two strata they include the whole corresponding ecological sub-zone In the case of the IFM activities, at the instance level, another level of stratification is added, dividing the forest by its sub-populations (Coniferous, Mixed and Broadleaf) as defined by the Canadian National Forest Inventory (NFI). These sub-strata match with the classification model used in the Quebec's ecoforest information system.

[46] See cell "L126" in sheet Balance LtPF in the file "Calculs_Net_Foret_Bromont_LtPF_JUillet2022_v2" available in : INCLUSION CARs\SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\VCUs Ex-ante estimation

All new instances ACA_2021_LTPF_002, ACA_2021_ERA_002 and SMB_2022_LTPF_003 are located in the ecological sub-zone in the deciduous forest (see Figure 4, Figure 5 and Figure 6) composed with the following sub-populations:

Instancias	Sub populations		
	Coniferous	Mixed	Broadleaf
ACA_2021_LTPF_002	0.31%	20.97%	78.72%
ACA_2021_ERA_002	4.86%	20.60%	74.48%
SMB_2022_LTPF_003	0.00%	1.05%	98.95%

3.3.1.4 The project start date must be after November 29, 2007

The instance inclusion date is 19-07-2022 for ACA_2021_LTPF_002. The field work for this instance started in October 28th, 2021 as it is showed in the monitoring field formats[47] and in the document "ACA's Start Date of VCU Production"[48]. The start date of this instance is fixed by the date defined in the final version of the "Baseline Adjustment" document, when all data processing and modeling were finished[49]

The instance inclusion date is 19-07-2022 for ACA_2021_ERA_002. The field work for this instances started in October 26th, 2021 as it is showed in the monitoring field formats[50] and in the document ACA's Start Date of VCU Production[51]". The start date of this instance is fixed by the date defined in the final version of the "Baseline Adjustment" document, when all data processing and modeling were finished[52]."

The instance inclusion date is 19-07-2022 for SMB_2022_LTPF_003. The field work for this instances started in May 20th ,2022 as it is showed in the monitoring field formats[53] and in the document "SMB's

[47] See document " ACA_original_2021_données_terrain". Available in: ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_LTPF_002\BL_ACA_2021_LtPF_002\Données_terrain_original

[48] See document "Date_debut_VCU_ACA_ERA" Available in: ACA_2021_LtPF_002\Legal Documents

[49] See document: "ACA baseline adjustment" Available in: 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_LtPF_002\BL_ACA_2021_ERA_002

[50] See document "ACA_original_2021_données_terrain" Available in : 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\BL_ACA_2021_ERA_002\Données_terrain_original

[51] See document "Date_debut_VCU_ACA_ERA" Available in: ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

[52] See document: "ACA baseline adjustment" Available in: 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\BL_ACA_2021_ERA_002

[53] See document "Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512" Available in : ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\SMB_2022_LTPF_003\BL_SMB_2022_LtPF_003\Données_terrain_avril22

start date of VCU production" [54]. The start date of this instance is fixed by the date defined in the final version of the "Baseline Adjustment" document, when all data processing and modeling were finished[55].

3.3.1.5 Project activities developed in BC must comply with the BC EOR. In the case of projects within other provinces, projects must comply with existent and relevant provincial emission offset regulation.

All activities implemented in these instances follow the guidelines of FHI forestry team and the implementing criteria of PIVOT, considering existent and relevant emission offset regulation generated by the Quebec Government.

3.3.1.6 Project activities must not include actions expected to significantly impact the hydrology of any site within the project area, including but not limited to flood irrigation or drainage.

ACA as owner of the plots belonging to instances ACA_2021_LTPF_002 and ACA_2021_ERA_002 and SMB as administrator of all plots part of instance SMB_2022_LTPF_003 refer to recognized environmental standards for the management of riparian strips. Both aggregators are committed to their own policies to assure the conservation of forest, including the protection of the hydrology of the project area.

3.3.1.7 Where an instance involves planting, the project must use genetically diverse and productive seed stock. For projects within the province of BC, projects must apply the BC Chief Forester's Standards for Seed Use. In the case of projects within other provinces, projects must comply with relevant provincial legislation and use

Not applicable for IFM activities. If enrichment plantation is required during the crediting period, all planting will comply with the requirement of genetically diverse and productive seed stock defined by the provincial government.

3.3.1.8 Instances under PIVOT will implement activities under the following VCS categories: ARR, IFM – LtPF and IFM – ERA

- Instance ACA_2021_LTPF_002 will implement IFM – LtPF activities.

[54] See document "Date_debut_VCU_SCMB(en cours)(signed)" Available in: SMB_2022_LTPF_003\Legal Documents

[55] See document "Bromont Baseline adjustment_final" Available in: ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\SMB_2022_LTPF_003\BL_SMB_2022_LtPF_003

- Instance ACA_2021_ERA_002 will implement IFM – ERA activities.
- Instance SMB_2022_LTPF_003 will implement IFM – LtPF activities.

3.3.1.9 Every instance shall provide a forest management document, including the main sylvicultural activities to be implemented and in coherence with the guidelines provided on this document.

- Information on forest management over the ACA_2021_LTPF_002 instance was provided in document in the eligibility report[56].
- Information on forest management over the ACA_2021_ERA_002 instance was provided in document in the eligibility report[57]
- Information on forest management over the SMB_2021_LTPF_003 instance was provided in document[58].

3.3.1.10 Project area must be forest land at the time of project commencement

The eligibility report of each instance proves that each instance (ACA_2021_LTPF_002, ACA_2021_ERA_002 and SMB_2021_LTPF_003) is forest at the project commencement. This land eligibility analyse is carried out according to the Forest Information System. Therefore, the information acquired confirmed the land cover as well as the forest type.

3.3.1.11 Instance proponents must provide field information for the adjustment of the baseline scenarios following the Baseline Carbon Flux Adjustment Standard Operational Procedure (B-SOP) under IFM-ERA and/or IFM-LtPF activities developed by Ecotierra

- Signature of the participation agreement (*Convention_Participation*)[59]
- Forest inventory field work [60]
- Baseline adjustment report [61]

[56] See 7.3 Rapport_éligibilité_ACA_2021-ERA-002 available in: ACA_2021_ERA_002\Elegibility Analyse

[57] See: 7.3 Rapport_éligibilité_2021-LtPF-002 available in ACA_2021_LTPF_002\Elegibility analyse

[58] See: 7.3 Rapport_éligibilité_2021-LtPF-003 available in SMB_2021_LTPF_003 \Elegibility analyse

[59] See 9.1 Convention_Participation_ACA in folder "ACA_2021_ERA_002\Legal Documents"or "ACA_2021_LTPF_002\Legal Documents". See 9.1 Convention_Participation_Pivot_Bromont in folder SMB_2022_LTPF_003\Legal Documents. See Entente Pivot-projet_Version_revisee_signée in folder FHI_2017_ERA_001\Legal.

[60] "Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512" available in: SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril22. " ACA_original_2021_données_terrain" available in BL_ACA_2021_ERA_002\Données_terrain_original. « ACA_original_2021_données_terrain » available in : ACA_2021_LTPF_002\BL_ACA_2021_LtPF_002\Données_terrain_original

3.3.1.12 Baseline

The baseline is evaluated during the phase of the eligibility analyse according to following elements:

1) Reviewing the trees harvesting regulations or in the zoning regulations of each municipality where the instance is located.
2) The Forestry management plan of each property (when it is available)
3) Historical Land Used of the property based on the Ecoforestry Quebec's System
4) Field visit (checking the presence of stumps)

As it stated in the PD, information published by the Regional Private Forest Development Agencies was used to describe the most common / business as usual scenario in the deciduous Forest stratum. It means that according to the location of the instances, it is determined the baseline scenario. In the deciduous forest stratum, the common practice / business as usual scenario for the development of forest management activities in productive private forest has been defined as partial cutting with irregular shelterwood or selective cutting approaches for coniferous stands starting by year 50 (every 15 years) and a 35% harvesting intensity.

In broadleaf and mixed stands, irregular shelterwood or selective cutting is applied also starting by year 50 and with a harvesting intensity of 30%. A precommercial thinning is implemented in some cases by year 30 aiming to extract 30% of the volume. It is important to highlight that as part of the land eligibility questionnaire[62], the following questions are asked:

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[61] See "ACA Baseline adjustment_Draft ENG" in folder ACA_2021_ERA_002\BL_ACA_2021_ERA_002. See "ACA Baseline adjustment_Draft ENG" available in ACA_2021_LTPF_002\BL_ACA_2021_LtPF_002. See "Ajustement_ligne_Base_Mont_Bromont" available in \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002.

[62] See "QuestionnaireEligibilite_Pivot_Brisebois" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See " QuestionnaireEligibilite_Pivot_Collins" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See "QuestionnaireEligibilite_Pivot_Karthoum" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See "QuestionnaireEligibilite_Pivot_MontFoste" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See "QuestionnaireEligibilite_Pivot_Nadeau" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See "QuestionnaireEligibilite_Pivot_Sifisa_II" in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

See "6.2 QuestionnaireEligibilite_SCMB_OAK(en cours)(signed)" in . ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Legal Documents

- Are the targeted parcels topographically accessible to the harvest, included in productive area in a calculation of possibility forest (if present) or have they already been harvested in the past? If yes, approximately what year?
- Does the harvesting of wood of more than 15 m^3 per year and minimum 30% every 15 years is permitted under regulations applicable? * Commercial harvesting must be permitted in the plot.

  To support the assumption that forest owners are allowed to harvest approximately 30% of the commercial volume over 15 years periods, the municipal zoning regulation that determines the maximum harvesting over defined periods is used. It is conservative to assume that 30% of commercial trees will represent over 30% of the commercial volume of the forest. When the regulations mention periods different of 15 years, the % is converted to a 15-year period. If the regulations does not allow harvestings equivalent to 30% of volume over 15-year period, the potential instance is not accepted. The table below show the information used for the different jurisdictions were PIVOT instances are implemented:

Table 11. Municipality regulations and harvesting intensity allowed

Jurisdiction	Instances	Article in the regulation
MRC Coaticook	FHI_2017_ERA_001 FHI_2017_LTPF_001	Article 8[63] Any harvesting of more than 30% of the commercial diameter stems of a cutting area over 10-year periods is allowed, with a certificate of authorization and a silvicultural prescription.
Ville de Bromont	SMB_2022_LTPF_003	Chapter 16[64], article 194 Harvesting of no more than 30% of the commercial trees of the given area over a 10-year period is allowed.
Municipalité de Saint-Étienne-de-Bolton	ACA_2021_LTPF_002	Section 4.2, Articles 116 and 117[65]

[63] Available in : https://www.mrcdecoaticook.qc.ca/Documentation/RCI/RCI%207-002%20(2016)_version%20admin._MAJ_24072017.pdf

[64] Available in: https://www.bromont.net/wp-content/uploads/2021/11/1037-2017_Zonage_25.pdf

		Thinning of no more than 20% of commercial stems over 12 years for areas with restrictions (article 116) and 30% over 12 years in areas of forestry exploitation (article 117).
Municipalité du Canton d'Orford	ACA_2021_LTPF_002	Section 3[66], Articles 10.7 and 10.8 Thinning cutting of a maximum of 30% of commercial stems, over a period of 12 years is permitted.
Municipalité de Bolton-Ouest	ACA_2021_LTPF_002	Chapter 16, Section 1, 16.1.8[67] Harvesting cannot exceed 40% of trees of commercial diameter over a period of 15 years.
Municipalité de Bolton-Est	ACA_2021_LtPF_002	Chapter 14[68], Article 14.3 Harvesting is allowed up to 30% of the commercial trees over a period of 12 years.
Muncipalité d'Eastman	ACA_2021_ERA_002	Chapitre 13[69]. Harvesting of commercial species is allowed removing at most 30% of commercial wood stems from the forest stand per period of 12 years.

[65] Available in: https://www.sedb.qc.ca/files/ssparagraph/f2745583202/2014_05_re768glement_zonage_lettre_mj_aout_2021.pdf

[66] Available in: https://voute.bape.gouv.qc.ca/dl/?id=00000506247

[67] Available in: https://bolton-ouest.ca/wp-content/uploads/2021/06/Reglement-264-2008-Zonage-Version-juin-2021.pdf

[68] https://www.boltonest.ca/Documents/ReglementsUrbanisme/Zonage_codifi%C3%A9_2023-01.pdf

[69] Available in: https://eastman.quebec/wp-content/uploads/2015/01/reglement-abattage-arbres.pdf

The threshold for commercial volume allowable harvest applied for assessing the eligibility of wood parcels is 30% in all cases. In general, all the regulations allow the harvesting an equivalent of 30% of stems in a period of 15 years, in the case of ACA_2021_LtPF_002, the mean value considering the area and the jurisdiction is also over 30% as shown in section 1.7.1.2.1, therefore this criterion of eligibility is meet in all the instances since the baseline of the project is much more conservative (30% of the commercial volume in 15 years).

The list of agencies and the area of productive forests can be found in Table 20 of the PD (Productive private forests in the deciduous forest stratum). See below the properties of each instance classified according to the regional private forest agency:

- **ACA_2021_LtPF_002**

Property	Forest Development Agency
Brisebois-Suprenant	Montérégie
Collins	Estrie
SIFISA	Montérégie
Sud Participation (Mont Foster)	Montérégie

- **ACA2021_ERA_002**

Khartoum property is under the Estrie's Regional Private Forest Development Agency.

- **SMB_2022_LTPF_003**

This instance is under the area of influence of the regional private forest agency of Monteregie.

3.3.1.13 Additionality

The additionally analysis was carried out for each instance according with the criteria stated in the PD. Forest Management for Timber is the most plausible scenario due to its implementation is not prevented by Technical, Investment, cultural, legal, or financial barriers is Forest Management for Timber:

Step 1 and Step 2: Identification of alternative scenarios and barrier analyse.

Table 12. Identification of alternative scenarios and barrier analysis of the new instances

	Instances		
Alternative scenarios	ACA2021_ERA_022	ACA_2021_LtPF_002	SMB_2022_LTPF_003
S1: PIVOT Project Scenario (without credits)	**Investment barriers:** - High cost of the municipality taxes evolution - the weighted average price paid to private forest lumber producers **Technical barriers:** The fact that under ERA activities, revolution periods in boreal, deciduous, and mixed forest goes up to 30 years, longer than the mean possession time of a parcel of land (less than 20 years), cause a direct negative impact on the viability of this type of activity, as the new owner does not always continue with the same silvicultural practices and with the same use of the area. **Cultural barriers:** lack of skilled labor in the Quebec forestry sector	**Investment financial barriers:** this scenario does not have any significant source of revenue, tax payments commitments become an even higher barrier for the forest owner.	
S2: Forest management for timber	As the most common practice / business as usual some of the barriers mentioned for the ERA and LtpF scenario could affect this scenario and reduce their financial performance. However, these are not barriers that prevent the scenario from being implemented to this day.		

S3: Forests without management	**Financial barriers:** This scenario does not have any significant source of revenue, tax payments commitments become an even higher barrier for the forest owner.
S4: Land use change to agriculture activities	**Technical / investment barriers:** Good agricultural land is extremely limited in Quebec; class A soils cover only 5.87 million acres (2.38 million ha). In order to achieve competitive production level over forest lands converted to agriculture lands high investments and new technology is required linked to high return products **Cultural barriers**:the notion of pleasure is the first motivation of an owner to hold a forest area and keep it as forest. The second motivation of most of forest owners is to obtain a supplementary income. This makes land use change from forestry to any other type of land use very difficult in the Quebec context. **Legal barriers:** the zoning regulation in each municipality provides for uses that are permitted and others that are prohibited, in many cases this includes land use change to agriculture as well as urban development in certain zonings (MAMOT, 2017)
S5: Land use change for Urban Development	**Legal barriers:** As well as for the land use change for agriculture scenario, zoning regulation is the main barrier identified, were municipalities frame land use change and allow them to be implemented only under certain specific conditions. **Cultural barriers:** As explained for S4 scenario, the cultural notion related to the preservation of the forest heritage is extremely powerful. This makes land use change from forestry to any other type of land use very difficult in the Quebec context.

Financial barriers:

In the land eligibility questionnaire, the following question is asked:

- How would the project activity be financed? Are the costs already covered? Example: grant from the Private Forest Agency. See land eligibility questionary for each property [70]

This question allows the PIVOT project team to evaluate if the project owner requires the incomes from VCUs to participate in the project.

Technical barriers:

In the land eligibility questionary as well as the monitoring questionary, the following question is asked:

- Do you intend to sell for development or to develop (deforestation) certain parts of your properties not affected by the Project Pivot? If so, what would be the nature of this development and what would be the deforested area?.

This question allows the PIVOT technical team to evaluate the permanence of the instances.
Additionally, the agreement between ACA and Ecotierra, as well as the agreement between SMB and ECOTIERRA is stated that the accreditation period that refers to the period during which the activities of the Project are authorized to generate VCUs in accordance with the standards of the Standard. The period of accreditation for Project activities, and therefore the duration of the Project is 80 years or until 2098.

Cultural barriers:

ACA

In the final stages of the inclusion process, two PIVOT-related technical training courses were organized in the fall of 2021 for ACA employees and administrators (22-10-2021 and 08-12-2021). A summary of all the meetings is presented[71].

SMB

Two PIVOT-related technical training courses were organized in the fall of 2021 for SMB technical team (31-03-2022). A summary of all the meetings is presented[72].

Step 3 Identification of the financial indicator

ACA_2021_ERA_002

NPV from project activities is expected to be between 20% and up to 50% more profitable than the most profitable alternative land use activity (47% for this instance). NPV in the baseline scenario is $

[70] ACA_2021_ERA_002: QuestionnaireEligibilite_Pivot_Brisebois, QuestionnaireEligibilite_Pivot_Collins, QuestionnaireEligibilite_Pivot_Karthoum , QuestionnaireEligibilite_Pivot_MontFoster, QuestionnaireEligibilite_Pivot_Nadeau and QuestionnaireEligibilite_Pivot_Sifisa_II available in : ACA_2021_ERA_002: \Legal Documents. ACA_2021_LtPF_002: QuestionnaireEligibilite_Pivot_Karthoum: ACA_2021_LtpF_002: \Legal Documents

[71] See Rencontres_Échanges_ACA_Ecotierra_PivotLELM available in: ACA_2021_ERA_002\Public consultation

[72] See Rencontres_Échanges_SCMB_Ecotierra_Pivot(en cours)(signed) available in: SMB_2022_LTPF_003\Public consultation

228,965.0 and the NPV in the project scenario $ 433,015.6. See “Annex V. Financial viability Financial_analyse_IFM_ERA_ACA_Initial.xls” and “Financial_analyse_BL_ACA_ERA_LtPF_Initial xls.

ACA_2021_LtPF_002

NPV from project activities is expected to be at least 20% and up to 50% more profitable than the most profitable alterative land use activity. NPV in the baseline scenario is $ 228,965.0 and the NPV in the project scenario $ 274,402.7 (20% in this instance). See “Annex V. Financial viability Financial_analyse_IFM_LtPF_ACA_Initial.xls” and “Financial_analyse_BL_ACA_ERA_LtPF_Initial xls.

SMB_2022_LTPF_003

NPV from project activities is expected to be between 20% and up to 50% more profitable than the most profitable alterative land use activity (38% in this instance). NPV in the baseline scenario is $ 94,535 and the NPV in the project scenario $ 246,721.8. See “Annex V. Financial viability Financial_analyse_IFM_LtPF_Bromont.xls” and “Financial_analyse_BL_Bromont xls.

Step 4: Common practice analysis

In the land eligibility questionnaire, the following question is asked:

- From what date is it planned to make the formal change of activity in the plot? * The modification date of the activity cannot be earlier than the start date of the activity. project.

If the project participant has decided to change the the land use activity to ERA or LtPF before the project start date, the potential area or instance is not eligible.

All ACA as well as SMB decided to change the the land use activity to ERA or LtPF after the project start date.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	LEF_M
Data unit	%
Description	Market leakage factor, applicable to IFM activities under the project, expressing the percentage of the total increase in project emissions due to market leakage during reporting period t.
Source of data	LEF_M values will be obtained from the VCS Leakage Discount Factor provided on Table 3 of the VCS Standard V.4.5.
Value applied	IFM – ERA activities – 10% IFM – LtPF activities – 20%
Justification of choice of data or description of measurement methods and procedures applied	Established by the VCS as default values.
Purpose of Data	Calculation of market leakage, equation 44 of the selected methodology.
Comments	Default factors for this variable may be subject to periodic re- assessment. The impact of FHI instance over the market size by years 1, 16 and 31 will be far below the 5% benchmark defined to consider this leakage.

Data / Parameter	CF, wood
Data unit	Tonne / tonne
Description	The fraction of the dry mass of wood, excluding bark, that is carbon.
Source of data	IPCC GPG for LULUCF Equation 3.2.3
Value applied	0.5
Justification of choice of data or description of measurement methods and procedures applied	Default factor given for this variable in the IPCC.
Purpose of Data	Calculation of baseline and project emissions.

Comments	None

Data / Parameter	GWP_j
Data unit	Dimensionless
Description	Global warming potential of gas j
Source of data	IPCC - Box 3.2, Table 1 . IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Available in: https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf
Value applied	
Justification of choice of data or description of measurement methods and procedures applied	Default factor given for this variable in the IPCC.
Purpose of Data	Calculation of baseline and project emissions, and leakage
Comments	None

GHG	Chemical formula	GWP – 100 years
Carbon dioxide	CO_2	1
Methane	CH_4	28
Nitrous oxide	N_2O	265

Data / Parameter	$HWP_{CH4}f_{X,t-y}$
Data unit	tCO_2e / t wood biomass delivered
Description	The factor for the amount of CH_4 (accounted as CO_2e) emitted in a given year, equal to the number of years between harvest and time t, for products used in area X, where X is either North America (NA) or offshore (O)

Source of data	North America data - Caren C. Dymond, Forest carbon in North America: annual storage and emissions from British Columbia's harvest 1965 - 2065, Carbon Balance and Management 7:8, 2012. Offshore data - Jack K. Winjum, Sandra Brown and Bernhard Schlamadinger, Forest Harvests and Wood Products: Sources and Sinks of Atmospheric Carbon Dioxide, Forest Science 44:2, 1998
Value applied	Various – presented in table 14 of THE VM0034 the methodology.
Justification of choice of data or description of measurement methods and procedures applied	The Dymond paper represents the most recent, assessment of C storage in HWP for North American markets, while the Winjum et.al. paper is the best available source for key factors for offshore markets
Purpose of Data	Calculation of baseline and project emissions.
Comments	Default factors for this variable may be subject to periodic re- assessment

Data / Parameter	$HWPf_{NA,t-y}$
Data unit	%
Description	The factor for the percentage of CO_2 remaining after the number of years between harvest and time t, for products used in North America.
Source of data	Derived from Caren C. Dymond, Forest carbon in North America: annual storage and emissions from British Columbia's harvest 1965 - 2065, Carbon Balance and Management 7:8, 2012, and K.E. Skog, Sequestration of carbon in harvested wood products for the United States, Forest Products Journal 58(6):56-72. (2008)
Value applied	Various – presented in table 9 of the methodology VM0034.

Justification of choice of data or description of measurement methods and procedures applied	The Dymond paper represents the most recent, assessment of C storage in HWP for North American markets.
Purpose of Data	Calculation of baseline and project emissions.
Comments	Default factors for this variable may be subject to periodic re- assessment

Data / Parameter	$HWPf_{o,t-y}$
Data unit	%
Description	The factor for the percentage of CO_2 remaining after the number of years between harvest and time t, for products used offshore.
Source of data	Derived from Caren C. Dymond, Forest carbon in North America: annual storage and emissions from British Columbia's harvest 1965 - 2065, Carbon Balance and Management 7:8, 2012, and Jack K. Winjum, Sandra Brown and Bernhard Schlamadinger, Forest Harvests and Wood Products: Sources and Sinks of Atmospheric Carbon Dioxide, Forest Science 44:2, 1998 and K.E. Skog, Sequestration of carbon in harvested wood products for the United States, Forest Products Journal 58(6):56-72. (2008)
Value applied	Various – presented in table 9 of the methodology.
Justification of choice of data or description of measurement methods and procedures applied	The Dymond paper represents the most recent, assessment of C storage in HWP for North American markets, while the Winjum et.al. paper is the best available source for key factors for offshore markets.
Purpose of Data	Calculation of baseline and project emissions.
Comments	Default factors for this variable may be subject to periodic re- assessment

Data / Parameter	wdf_s / wdf_{gs}
Data unit	t/m^3
Description	Wood density for species (s) or group of species (gs)
Source of data	J.S. Gonzalez. Wood density of Canadian tree species. Edmonton: Forestry Canada, Northwest Region, Northern Forestry Centre,1990, Inform. Rept. NOR-X-315
Value applied	

	Continuous Boreal Forest	Mixed Forest	Deciduous Forest
Wood density (wdf_{gs})	0.43	0.45	0.47

Justification of choice of data or description of measurement methods and procedures applied	The Gonzalez study is a published meta-study reviewing a wide range of research results for wood densities.
Purpose of Data	Calculation of baseline and project emissions, and leakage
Comments	None

Data / Parameter	$DWD_{DC,G,DWT}$
Data unit	t/m^3
Description	Wood density by decay class (DC), tree group (G) and deadwood type (DWT)
Source of data	M. Seedre et al (2013). Deadwood density of five boreal tree species in relation to field-assigned decay class. In Forest Science June 2013. Available in: https://academic.oup.com/forestscience/article/59/3/261/4583673?login=false or in the folder Annex\Sources

Value applied	<table><tr><th rowspan="2">Deadwood type</th><th rowspan="2">Group</th><th colspan="3">Decay Class Group - Mean density (t/m³)</th></tr><tr><th>1</th><th>2</th><th>3</th></tr><tr><td rowspan="2">Lying deadwood</td><td>Coniferous</td><td>0.46</td><td>0.23</td><td>0.09</td></tr><tr><td>Broadleaf</td><td>0.42</td><td>0.21</td><td>0.13</td></tr><tr><td rowspan="2">Standing deadwood</td><td>Coniferous</td><td>0.42</td><td>0.31</td><td>0.19</td></tr><tr><td>Broadleaf</td><td>0.41</td><td>0.36</td><td>0.27</td></tr><tr><td rowspan="2">Stump</td><td>Coniferous</td><td>0.29</td><td>0.16</td><td>0.09</td></tr><tr><td>Broadleaf</td><td>0.35</td><td>0.27</td><td>0.15</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied	Data provided by the latest study published by the Canadian Forest Service including species commonly present in the project and ecosystems conditions similar to the project potential area.
Purpose of Data	Calculation of deadwood carbon flow. See Table 29 of this document.
Comments	None

Data / Parameter	R_j
Data unit	Dimensionless
Description	Root-shoot ratio for tree species
Source of data	IFM activities - TABLE 3A.1.8 of the Aneex 3A.1 of The IPCC LULUCF GPG (2006). Available in: https://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf_files/Chp3/Anx_3A_1_Data_Tables.pdf ARR activities - Equation provided by the AR Tool 14
Value applied	IFM activities <table><tr><th>Group</th><th>AGB (t/ha)</th><th>R_j</th></tr><tr><td rowspan="2">Conifers</td><td><75 t/ha</td><td>0.39</td></tr><tr><td>>75 t/ha</td><td>0.24</td></tr></table>

	<table><tr><td rowspan="3">Broadleaf</td><td><50 t/ha</td><td>0.40</td></tr><tr><td>50 -150 t/ha</td><td>0.29</td></tr><tr><td>>150 t/ha</td><td>0.20</td></tr></table> ARR activities Rj = (e (- 1.085 + 0.9256 * ln(b)) / b Where: Rj Root-shoot ratio for tree specie j; dimensionless b Above-ground tree biomass per ha; t d.m. ha-1
Justification of choice of data or description of measurement methods and procedures applied	Requested by the methodology and the abovementioned tool.
Purpose of Data	Calculation of the project and baseline scenarios.
Comments	N.A.

Data / Parameter	$COMF_i$
Data unit	dimensionless
Description	Combustion factor for stratum i (linked to bioclimatic sub-domains)
Source of data	A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)
Value applied	<table><tr><th>Strata</th><th>$COMF_i$</th></tr><tr><td>Continuous Boreal Forest</td><td>0.40</td></tr><tr><td>Mixed Forest</td><td>0.45</td></tr><tr><td>Deciduous forest</td><td>0.45</td></tr></table>
Justification of choice of data or description of measurement methods and procedures applied	Requested by the A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)

Purpose of Data	Calculation of the project emissions related to forest fires.
Comments	N.A.

Data / Parameter	EF_{CH4}
Data unit	g kg-1 dry matter burnt
Description	Emission factor for CH4 in stratum i
Source of data	A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)
Value applied	4.7
Justification of choice of data or description of measurement methods and procedures applied	Requested by the A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)
Purpose of Data	Calculation of the project emissions related to forest fires.
Comments	N.A.

Data / Parameter	EF_{N2O}
Data unit	g kg^{-1} dry matter burnt
Description	Emission factor for N_2O in stratum i
Source of data	A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)
Value applied	0.26
Justification of choice of data or description of measurement methods and procedures applied	Requested by the A/R Methodological tool for the Estimation of non-CO_2 GHG emissions resulting from burning of biomass attributable to an A/R CDM project activity (Version 04.0.0)
Purpose of Data	Calculation of project emissions related to forest fires.
Comments	N.A.

4.2 Data and Parameters Monitored

Data / Parameter	$A_{plot.i}$. A_i
Data unit	ha
Description	Area of a sample plot for instance i; area of instance i.
Source of data	Field measurement
Description of measurement methods and procedures to be applied	The SOP of monitoring plan described in detail the measurement methods. This document was elaborated according to the National forest inventory of Canada. People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Frequency of monitoring/recording	At every verification.
Value monitored	Aplot.i A large tree plot (LTP). with a radius of 11.28 m and an area of 400 m^2 (0.04 ha). for measuring attributes of large trees (trees with DBH ≥ 9.1 cm). A small tree plot (STP) with a radius of 3.99 m and area of 50 m^2 (0.005 ha). for measuring small trees (trees ≥ 1.3 m in height with a DBH < 9.0 cm). and stumps (< 1.3 m in height *Ai;).; Area of the instance that meet the land eleibility*

	criteria *Instance* / *Area (ha)* *FHI_2017_LTPF_001* — *664.9* *FHI_2017_ERA_001* — *133.6* *ACA_2021_ERA_002* — *401.6* *ACA_2021_LTPF_002* — *509.4* *SMB_2022_LTPF_003* — *256.3*
Monitoring equipment	GPS (Garmin SCx or other high precision instrument) and SIG software (ArcGIS or similar)
QA/QC procedures to be applied	GPS calibration and Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • Before going out into the field, the team check the plan visit to ensure you go out at the best time of the day. Generally the more satellites that are available, the less likely you are to encounter poor Geometric/Position Dilution of Precision situations. • Stand in the clear spot in the forest, and use a laser rangefinder to shoot the trees that you need to collect data on. The data collection system automatically calculates the distance and bearing from your GPS position to the feature you need to record and logs the adjusted GPS position in the file. • The center point of the plot (the location of the reference point) was identified with the GPS. However, as there is still error in the GPS readings, especially in dense timber and on steep slopes, the crew control the correct position of the center point by using the control point established during the application of the B-SOP. • The Data projection system should be NAD 83 MTM zone 7 in the case of instances locate in Estrie and Monteregie Quebec's region. • The unit of the plot area should be hectares • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before final analysis

	of the monitoring data can be completed. • A random check will be made over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of the data	Calculation of project carbon sequestration.
Calculation method	*Ai;* Instance areas is generated using SIG information provided by the aggregators. This is calculated with the tool "calculate geometry' within the attribute table of the Arcgis under the projected coordinate system NAD 83 MTM zone 7.If Qgis is used. the field calculator tool is used to have the value area in hectares. Aplot.i Monitoring plots Area is defined for the project following the guidelines of the Canadian National Forestry Inventory. This area is determined using this equation: $Aplot.I = \pi * r^2$ Where: *Aplot.i= Area of the monitoring plot* r^2= distance from the center of the circle to any point on the circumference. The center point of the plot (the location of the reference point) will be identified with the GPS. However. as there is still error in the GPS readings. especially in dense timber and on steep slopes. the crew will establish two control points (the center point of the plot and a tree located inside the plot) to measure angles and distances between points and assure the location of the central point of the plot.
Comments	

Data / Parameter	$Instance_{ID}$

Data unit	Dimensionless
Description	Identification code for each instance
Source of data	Project database
Description of measurement methods and procedures to be applied	The Project database will assign an ID code for each new instance registered on the system. This ID will be used in all documents and tools related to that instance during the whole project implementation process. Dany Senay (Strategic Forestry Advisor) is responsible of assigning the ID of each instance.
Frequency of monitoring/recording	Once at the beginning of the eligibility process of each potential instance.
Value monitored	<table><tr><td>Aggregator</td><td>ID instace</td></tr><tr><td>FHI</td><td>FHI_2017_ERA_001</td></tr><tr><td>FHI</td><td>FHI_2017_LTPF_001</td></tr><tr><td>ACA</td><td>ACA_2021_ERA_002</td></tr><tr><td>ACA</td><td>ACA_2021_LTPF_002</td></tr><tr><td>SMB</td><td>SMB_2022_LTPF_003</td></tr></table>
Monitoring equipment	N.A.
QA/QC procedures to be applied	The ID of the instance is created according to the acronym of the instance aggregator. the year of the instance inclusion. the project activity acronym and the correlated number of inclusions according to the project activity and the date. This will avoid an ID repetition and the ID is self explanatory.
Purpose of the data	Monitoring of project implementation.
Calculation method	N.A.
Comments	N.A.

Data / Parameter	$Mp_{location}$
Data unit	UTM
Description	Location coordinates of the monitoring plots
Source of data	Field measurement
Description of measurement methods and procedures to be applied	Monitoring plots (sampling plots) location will be defined following the procedure determined on the M-SOP. Information gathered on the field will be registered on the GPS and transferred to the project database for cross check.

	People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Frequency of monitoring/recording	Location defined at the time of calculation of the sample size and preparation of the monitoring plots map. Control at the installation of the sample plot and once before every verification.
Value monitored	Data location could be validated in the attribute table of the plot location "shp file". It is also available in kizeo forms.

FHI_2017_ERA_001[1]		
ID plot	Latitud	Longitud
27198	45.0336	-71.6094
22448	45.0435	-71.5144
1900	45.0832	-71.5471
30754	45.0273	-71.6037
32298	45.0246	-71.5148
25618	45.0372	-71.6113
27598	45.0334	-71.6059
1316	45.0844	-71.5433
4083	45.0791	-71.5385

[1] see Column "lat" and "log"of the shp "all_pe "Available in: FHI_2017_ERA_001\Monitoring Forest Inventory\plan_sondage\all_pe

FHI_2017_LTPF_001[2]		
ID plot	LATITUD	LONGITUD
3	45.070	-71.534

4	45.086	-71.598
5	45.092	-71.607
6	45.102	-71.573
7	45.013	-71.557
9	45.037	-71.529
10	45.043	-71.548
11	45.054	-71.533
12	45.058	-71.525
13	45.090	-71.551
14	45.092	-71.551
15	45.037	-71.527
16	45.081	-71.607
17	45.083	-71.610

[2] see: Column “lat” and “log“of the shp “all_pe” Available in: FHI_2017_LtPF_001\Monitoring Forest Inventory\plan_sondage

ACA_2021_ERA_002[3]		
ID	Latitud	Longitud
374	45.3612	-72.3115
525	45.3601	-72.3094
3264	45.3388	-72.3121
2045	45.3483	-72.3088
3304	45.3385	-72.3169
2261	45.3464	-72.3245
1609	45.3517	-72.3061
2780	45.3426	-72.3088
3409	45.3377	-72.3131
2244	45.3468	-72.3072

[3] See: Column “lat” and “log“of the shp “all_pe” Available in: ACA_2021_ERA_002\Elegibility Analyse\plan_sondage\all_pe

ACA_2021_LTPF_002[4]		
Id	Latitud	Longitud
206856	45.2318	-72.3853
197836	45.2397	-72.3912
199980	45.2378	-72.3918
213267	45.2261	-72.3982
201014	45.2371	-72.2969
210280	45.2287	-72.3896
200166	45.2378	-72.2915
220185	45.2200	-72.3691
215488	45.2242	-72.3573
199710	45.2382	-72.3061
209405	45.2295	-72.3988

[4] See: Column “lat” and “log“of the shp “all_pe” Available

	in: ACA_2021_LTPF_002\Elegibility analyse\plan_sondage\all_pe

SMB_2022_LTPF_003[5]		
Id	Latitud	Longitud
1645	45.3005	-72.6778
9081	45.2827	-72.6977
11933	45.2758	-72.7031
8208	45.2850	-72.6540
9475	45.2819	-72.6567
9157	45.2829	-72.6566
7737	45.2861	-72.6508
8380	45.2846	-72.6470
10589	45.2793	-72.6562
15441	45.2675	-72.6977

[5] See: Column “lat” and “log“of the shp “all_pe” Available in: SMB_2022_LTPF_003\Elegibility Analyse\plan_sondage\all_pe

Monitoring equipment	GPS (Garmin SCx or other high precision instrument) and SIG software (ArcGIS or similar)
QA/QC procedures to be applied	GPS calibration and Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • Before going out into the field, the team check the plan visit to ensure you go out at the best time of the day. Generally, the more satellites that are available, the less likely you are to encounter poor Geometric/Position Dilution of Precision situations. • Stand in the clear spot in the forest and use a laser rangefinder to shoot the trees that you need to collect data on. The data collection system automatically calculates the distance and bearing from your GPS position to the feature you need to record and logs the adjusted GPS position in the file. • The center point of the plot (the location of the reference point) was identified with the GPS. However, as there is still error in the GPS readings, especially in dense timber and on steep slopes, the crew control the correct position of the center point by using the control point established during the application of the B-SOP. • The Data projection system should be NAD 83 MTM zone 7 in the case of instances locate in Estrie and Monteregie Quebec’s region. • The unit of the plot area should be hectares

	• To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of the data	Calculation of project carbon sequestration.
Calculation method	N.A.
Comments	

Data / Parameter	Dap
Data unit	cm
Description	Diameter at breast height for trees
Source of data	Field measurements in sample plots
Description of measurement methods and procedures to be applied	Diameter at breast height above ground level of the tree will be measure following the guidelines provided on the M-SOP. People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA

<table>
<tr><td></td><td>Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field.
SMB
Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Once before every verification.</td></tr>
<tr><td>Value monitored</td><td>Value monitored are available in the following source:

<table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>FHI_2017_ERA_001</td><td>Large trees: « Worksheet» and « AW » column Small trees: « Worksheet» and « BG » column</td></tr></table>
See “Formulaire_Terrain_FHI_ERA” Available in: INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA

<table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>FHI_2017_LtPF_001</td><td>Large trees: « Worksheet» and « AW » column Small trees: « Worksheet» and « BG » column</td></tr></table>
See “ Formulaire_Terrain_FHI_LtPF ” Available in : INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF

<table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>ACA_2021_ERA_002</td><td>Large trees: « Worksheet» and « AW » column Small trees: « Worksheet» and « BF » column</td></tr></table>
See “ACA_2021_données_terrain_ERA “ Available in: INFO_AENOR \ACA_2021_ERA_002\Elegibility Analyse\ ACA_2021_données_terrain_ERA</td></tr>
</table>

	<table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>ACA_2021_LTPF_002</td><td>Large trees: « Worksheet» and « AW » column Small trees: « Worksheet» and « BF » column</td></tr></table> See “ACA_2021_données_terrain_LtPF” Available in: INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\ ACA_2021_données_terrain_LtPF <table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>SMB_2022_LTPF_003</td><td>Large trees: « Worksheet» and « AW » column Small trees: « Worksheet» and « BF » column</td></tr></table> See « Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512 » Available in :INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril22avril22\Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512
Monitoring equipment	Caliper or diameter tape.
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures established in the project monitoring SOP are applied. • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of the data	Calculation of project carbon sequestration.
Calculation method	Measured on the field.

Comments	No comments

Data / Parameter	DC_{DW}
Data unit	Dimensionless
Description	Decay class of standing dead wood / stump / lying deadwood
Source of data	Field assessment
Description of measurement methods and procedures to be applied	The average decay class is based on the condition of the entire piece of deadwood. The three classes used for stumps are defined by bark, wood texture,and presence of wigs.
Frequency of monitoring/recording	Once before every verification.
Value monitored	Value monitored are available in the following source:

Instance	Excel sheet and Column
FHI_2017_ERA_001	Deadwood stumps: « Worksheet» and « BY » Dealying: « Worksheet» and « CJ » column

Available in: INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA

Instance	Excel sheet and Column
FHI_2017_LtPF_001	Deadwood stumps: « Worksheet» and « BY » Dealying: « Worksheet» and « CJ » column

INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF

Instance	Excel sheet and Column
ACA_2021_ERA_002	Deadwood stumps: « Worksheet» and « BM » Dealying: « Worksheet» and « BX » column

INFO_AENOR \ACA_2021_ERA_002\Elegibility Analyse\ ACA_2021_données_terrain_ERA

Instance	Excel sheet and Column
ACA_2021_LTPF_002	Deadwood stumps: « Worksheet» and « BM » Dealying: « Worksheet» and « BX » column

INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\

	ACA_2021_données_terrain_LtPF **Instance** / **Excel sheet and Column** SMB_2022_LTPF_003 / Deadwood stumps: « Worksheet» and « BM » Dealying: « Worksheet» and « BX » column INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril 22\Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512
Monitoring equipment	Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied.
QA/QC procedures to be applied	Calculation of project carbon sequestration.
Purpose of the data	N.A.
Calculation method	Measured on the field.
Comments	

Data / Parameter	D_{MID_STUMP}
Data unit	cm
Description	Mid-height diameter of the dead tree stump. People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Source of data	Field estimation or measurement

<table>
<tr><td>Description of measurement methods and procedures to be applied</td><td>For standing dead wood / stumps - diameter at the top of the piece to the nearest 0.1 cm including bark in the measurement. If there is no bark, the top diameter will be equal to the top diameter inside bark.

For standard lying deadwood pieces – dimeter to the nearest 0.1 cm, the diameter of each piece of woody debris perpendicular to the bole.

For accumulation or irregular dead wood pieces - to the nearest 1 cm, the average depth along the transect of the piece of dead wood debris.

For accumulations, record the average depth, remembering to visually compress the pile and not measure spaces between pieces.</td></tr>
<tr><td>Frequency of monitoring/recording</td><td>Once before every verification.</td></tr>
<tr><td>Value monitored</td><td>Value monitored are available in the following source:

<table>
<tr><th>Instance</th><th>Excel sheet and Column</th></tr>
<tr><td>FHI_2017_ERA_001</td><td>Deadwood stumps:
« Worksheet» and « BZ »</td></tr>
</table>
See file “Formulaire_Terrain_FHI_ERA” Available in:
INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA

<table>
<tr><th>Instance</th><th>Excel sheet and Column</th></tr>
<tr><td>FHI_2017_LtPF_001</td><td>Deadwood stumps:
« Worksheet» and « BZ »</td></tr>
</table>
See file « Formulaire_Terrain_FHI_LtPF » available in :
INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF

<table>
<tr><th>Instance</th><th>Excel sheet and Column</th></tr>
<tr><td>ACA_2021_ERA_002</td><td>Deadwood stumps: « Worksheet» and « BN»</td></tr>
</table>
See file “INFO_AENOR \ACA_2021_données_terrain_ERA” available in:
86CÁ_2021_ERA_002\Elegibility Analyse\
ACA_2021_données_terrain_ERA

<table>
<tr><th>Instance</th><th>Excel sheet and Column</th></tr>
</table>
</td></tr>
</table>

	<table><tr><td>ACA_2021_LTPF_002</td><td>Deadwood stumps: « Worksheet» and « BN»</td></tr></table> See file “ACA_2021_données_terrain_LtPF “ available in INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\ ACA_2021_données_terrain_LtPF <table><tr><th>Instance</th><th>Excel sheet and Column</th></tr><tr><td>SMB_2022_LTPF_003</td><td>Deadwood stumps: « Worksheet» and « BN»</td></tr></table> INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril 22\Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512
Monitoring equipment	Caliper. measuring tape or stick.
QA/QC procedures to be applied	GPS calibration and Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made on over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of the data	Calculation of project carbon sequestration.
Calculation method	Direct measure in monitoring plots.
Comments	N.A.

Data / Parameter	L_{DWS}
Data unit	m

Description	Length of standing dead wood / stump. length of standard / accumulation / irregular lying dead wood pieces. People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Source of data	Field estimation or measurement
Description of measurement methods and procedures to be applied	Length of the piece to the nearest 0.1 m, for standing dead wood / stumps. horizontal length to the nearest 1 cm along the transect of each odd-shaped piece of woody debris. For accumulations, measure the distance along the transect to the nearest centimeter.
Frequency of monitoring/recording	Once before every verification.

Value monitored	Value monitored are available in the following source:

Instance	Excel sheet and Column
FHI_2017_ERA_001	Dead lying: « Worksheet» and « CL »

Available in: INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA

Instance	Excel sheet and Column
FHI_2017_LtPF_001	Dead lying: « Worksheet» and « CL

INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF

Instance	Excel sheet and Column
ACA_2021_ERA_002	Dead lying: « Worksheet» and « BZ »

INFO_AENOR \ACA_2021_ERA_002\Elegibility Analyse\ ACA_2021_données_terrain_ERA

Instance	Excel sheet and Column
ACA_2021_LTPF_002	Dead lying: « Worksheet» and « BZ»

INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\ ACA_2021_données_terrain_LtPF

Instance	Excel sheet and Column
SMB_2022_LTPF_003	Dead lying: « Worksheet» and « BZ

INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril22\Formulaire_Terrain_-

Monitoring equipment	Measuring tape
QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made on over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of data	Calculation of project carbon sequestration.
Calculation Method	Direct measure in monitoring plots.
Comments	N.A.

Data / Parameter	DWC
Data unit	Dimensionless

Description	Deadwood class People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Source of data	Field assessment
Description of measurement methods and procedures to be applied	DWC defines the class of lying dead wood of each piece: Large dead wood (LDW): Pieces > 30.0 cm (or equivalent cross section) in diameter. Medium dead wood (MDW): Pieces > 10 cm and ≤ 30.0 cm (or equivalent cross-section) in diameter.
Frequency of monitoring/recording	Once before every verification.

Value monitored	**Value monitored are available in the following source:** | Instance	Excel sheet and Column
---	---
FHI_2017_ERA_001	Dead lying: « Worksheet» and « CH | **Available in: INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA** | Instance	Excel sheet and Column
---	---
FHI_2017_LtPF_001	Dead lying: « Worksheet» and « CH » | **INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF** | Instance	Excel sheet and Column
---	---
ACA_2021_ERA_002	Dead lying: « Worksheet» and « BV | **INFO_AENOR \ACA_2021_ERA_002\Elegibility Analyse\ ACA_2021_données_terrain_ERA** | Instance	Excel sheet and Column
---	---
ACA_2021_LTPF_002	Dead lying: « Worksheet» and « BV» | **INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\ ACA_2021_données_terrain_LtPF** | Instance	Excel sheet and Column
---	---
SMB_2022_LTPF_003	Dead lying: « Worksheet» and « BV » | **INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril 22\Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512**
Monitoring equipment	**Measuring tape or stick.**

QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made on over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of data	Calculation of project carbon sequestration.
Calculation Method	Measure in monitoring plots.
Comments	N.A.

Data / Parameter	DWT
Data unit	Dimensionless

Description	Deadwood type People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the fieldwork. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Source of data	Field assessment
Description of measurement methods and procedures to be applied	For each occurrence. record the appropriate one-letter code: • S - Standard • A - Accumulation • O - Odd-shaped piece
Frequency of monitoring/recording	Once before every verification.

Value monitored	**Value monitored are available in the following source:** | Instance	Excel sheet and Column
---	---
FHI_2017_ERA_001	Dead lying: « Worksheet» and « CI | **Available in: INFO_AENOR\FHI_2017_ERA_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_ERA** | Instance	Excel sheet and Column
---	---
FHI_2017_LtPF_001	Dead lying: « Worksheet» and « BW | **INFO_AENOR\FHI_2017_LtPF_001\Monitoring Forest Inventory\Données_inventaire_vérif/ Formulaire_Terrain_FHI_LtPF** | Instance	Excel sheet and Column
---	---
ACA_2021_ERA_002	Dead lying: « Worksheet» and « BW | **INFO_AENOR \ACA_2021_ERA_002\Elegibility Analyse\ ACA_2021_données_terrain_ERA** | Instance	Excel sheet and Column
---	---
ACA_2021_LTPF_002	Dead lying: « Worksheet» and « BW | **INFO_AENOR \ACA_2021_LtPF_002\Elegibility Analyse\ ACA_2021_données_terrain_LtPF** | Instance	Excel sheet and Column
---	---
SMB_2022_LTPF_003	Dead lying: « Worksheet» and « BW | **INFO_AENOR \SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\Données_terrain_avril 22\Formulaire_Terrain_-_Plan_de_Suivi_GES__20220512**
Monitoring equipment	**N.A.**

QA/QC procedures to be applied	Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analysing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of data	Calculation of project carbon sequestration.
Calculation Method	Direct measure in monitoring plots.
Comments	N.A.

Data / Parameter	$A_{burn.i.t}$
Data unit	ha

Description	Area of land subjected to forest fires in stratum i year t People responsible for this data or parameter in each instance are presented below: FHI Dany Senay Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford. These activities include the coordination of the field work. ACA Clément Robidoux (Senior Biologist) Responsible of the project activities of ACA including the coordination of the work field. SMB Marc-Antoine Demers (Forestry policy analyst) Responsible of the project activities of SMB including the coordination of the work field.
Source of data	Field measurement
Description of measurement methods and procedures to be applied	The area shall be delineated either on the ground using GPS or from georeferenced remote sensing data
Frequency of monitoring/recording	For each fire event.

Value monitored	FHI_2017_ERA_001 2018-2019=0 2019-2020 = 0 2020-2021 = 0 2021-2022 = 0 Source : see question *"3. Est-ce que des pertubations naturelles ont affecté les parcelles?"* INFO_AENOR\FHI_2017_ERA_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021\ sheet "Annuel Allongement" FHI_2017_LtPF_001 2018-2019=0 2019-2020 = 0 2020-2021 = 0 2021-2022 = 0 See question "3. Est-ce que des pertubations naturelles ont affecté les parcelles?" INFO_AENOR\FHI_2017_LtPF_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021 \ sheet "Annuel Conservation"
Monitoring equipment	GPS (Garmin SCx or other high precision instrument) and SIG software (ArcGIS or similar)
QA/QC procedures to be applied	GPS calibration and Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied.
Purpose of data	Calculation of project emissions due to forest fires.
Calculation Method	Direct measure on the field.
Comments	N.A.

Data / Parameter	$AL_{f.e.t}$
Data unit	Volumetric measure (eg. l. m^3. etc.) or mass measure (kg. t. etc.) with appropriate conversion
Description	The quantity of fuel of type f combusted in equipment/vehicle type e during reporting period t.

Source of data	Monitoring of fuel consumption.
Description of measurement methods and procedures to be applied	Fuel consumption records by type of equipment or vehicle and fuel type or records by fuel type only may be used.
Frequency of monitoring/recording	Continuous
Value monitored	*FHI_2017_LtPF_001* *2018-2019=0* *2019-2020 = 0* *2020-2021 = 0* *2021-2022 = 0* **Source : see question "1. Avez-vous réalisé des activités d'aménagement pour la conservation (enrichissement. arrachage d'espèces exotiques. élagague. etc.)? File location : INFO_AENOR\FHI_2017_LtPF_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021 \ sheet "Annuel Conservation"** *FHI_2017_ERA_001* *2018-2019=0* *2019-2020 = 0* *2020-2021 = 0* *2021-2022 = 0* **Source : see question « 1. Avez-vous réalisé des activités pré-commerciale ou autres activités (élaguage. enrichissement. arrachage d'espèces exotiques. etc.)"** **« 2. Avez-vous réalisé des travaux de récolte de bois commerciale (de plus de 15 m³)?"** File location: INFO_AENOR\FHI_2017_ERA_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021\ sheet "Annuel Allongement"

QA/QC procedures to be applied	GPS calibration and Quality control/quality assurance (QA/QC) procedures established in the M-SOP are applied. • Before going out into the field, the team check the plan visit to ensure you go out at the best time of the day. Generally, the more satellites that are available, the less likely you are to encounter poor Geometric/Position Dilution of Precision situations. • Stand in the clear spot in the forest and use a laser rangefinder to shoot the trees that you need to collect data on. The data collection system automatically calculates the distance and bearing from your GPS position to the feature you need to record and logs the adjusted GPS position in the file. • The center point of the plot (the location of the reference point) was identified with the GPS. However, as there is still error in the GPS readings, especially in dense timber and on steep slopes, the crew control the correct position of the center point by using the control point established during the application of the B-SOP. • The Data projection system should be NAD 83 MTM zone 7 in the case of instances located in Estrie and Monteregie Quebec's region. • The unit of the plot area should be hectares • To ensure that data is entered (registered) correctly, the person entering it will recheck all the data entered (registered) and compare it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed. • A random check will be made on over 10 % of the data entered in the database by the project manager. If there are any problems that cannot be resolved with one of the plot data, the plot will not be used in the analysis. • Documents showing that these procedures were followed will be archived along with the project documentation. The document will include a list of members of the field team and the project leader will certify that the crew members were trained.
Purpose of data	Calculation of project emissions and estimation of baseline emissions.
Calculation method	Direct measures by aggregators.
Comments	N.A.

Data / Parameter	LEF_M
Data unit	%
Description	Market leakage factor, applicable to IFM activities under the project, expressing the percentage of the total increase in project emissions due to market leakage during reporting period t.
Source of data	LEF_M values will be obtained from the VCS Leakage Discount Factor provided on Table 3 of the VCS Standard V.4.5.
Value applied	IFM – ERA activities – 0% IFM – LtPF activities – 20%
Justification of choice of data or description of measurement methods and procedures applied	Established by the VCS as default values.
Purpose of Data	Calculation of market leakage, equation 44 of the selected methodology.
Comments	Default factors for this variable may be subject to periodic re- assessment.

Data / Parameter	$AL_{H.t}$
Data unit	Tonnes
Description	The quantity of harvested wood product H produced from wood harvested during reporting period t.
Source of data	annual monitoring of GHG sources

Description of measurement methods and procedures to be applied	The measurement of the wood delivered is carried out by the manufacturer who buys the wood. The measurement method varies depending on the mill receiving the wood. The forestry producers' unions employ a forestry technician who has specialized training in measurement, and they carry out checks to testify to the accuracy of the measurement. Some mills buy lumber by weight (green tons or oven dry tons), apparent volume (cords, apparent cubic meters), actual volume (solid cubic meters without spaces between logs) or PMP in sawn lumber. A PMP corresponds to a board foot measurement equivalent to 12 inches by 12 inches by 1 inch. To know the number of PMP in a log, three conversion tables are used: the Roy table, the international table and the Maine (Bangor) table.
Frequency of monitoring/recording	Every time harvesting is conducted.

Value monitored	*FHI_2017_LtPF_001* *2018-2019=0* *2019-2020 = 0* *2020-2021 = 0* *2021-2022 = 0* **Source : see question "1. Avez-vous réalisé des activités d'aménagement pour la conservation (enrichissement. arrachage d'espèces exotiques. élagague. etc.)? « 3. Avez-vous récolté du bois à des fins personnelles (ex. bois de chauffage)?» File location : INFO_AENOR\FHI_2017_LtPF_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021 \ sheet "Annuel Conservation"** *FHI_2017_ERA_001* *2018-2019=0* *2019-2020 = 0* *2020-2021 = 0* *2021-2022 = 0* **Source : see question «** **« 2. Avez-vous réalisé des travaux de récolte de bois commerciale (de plus de 15 m³)?" « 4. Avez-vous récolté du bois à des fins personnelles (ex. bois de chauffage)? »** File location: INFO_AENOR\FHI_2017_ERA_001\Monitoring GHG sources\11.1 Monitoring_FHI_2021\ sheet "Annuel Allongement"
QA/QC procedures to be applied	Data collection and calculation procedures and activities will be reviewed and checked by forestry professionals.
Purpose of data	Calculation of project emissions and estimation of baseline emissions.
Calculation method	Direct measure by aggregator and buy the mill that buys the wood. Some mills buy lumber by weight (green tons or oven dry tons), apparent volume (cords, apparent cubic meters), actual volume (solid cubic meters without spaces between logs) or PMP in sawn lumber. A PMP corresponds to a board foot measurement equivalent to 12 inches by 12 inches by 1 inch. To know the number of PMP in a log, three conversion tables are used: the Roy table, the international table and the Maine (Bangor) table.
Comments	N.A.

Data / Parameter	$EF_{f.e.j}$
Data unit	t / unit of fuel
Description	The emission factor for GHG j. fuel type f and equipment / vehicle type e (eg. tonnes CO_2 per L diesel].
Source of data	Emission factors approved for use in Quebec. **Source. Gouvernament du Quebec (2019). Transitionenergetique. Facteurs d'émission et de conversion. Tableau des facteurs d'émissions et de conversion.** Available in: https://transitionenergetique.gouv.qc.ca/en/affaires/programmes/bioenergies/publications-et-formulaires
Description of measurement methods and procedures to be applied	Monitored from identified external sources.
Frequency of monitoring/recording	Every reporting period

Value monitored

Forme d'énergie	Unité	Émission (g/unité)
		CO_2e
Biocharbon	Kg	3 222.97
Biodiésel	L	2 497.00
Biogaz (portion métane)	m3	1 889.32
Biométhanol (100%)	L	1 519.00
Bitume	L	1 778.40
Butane	L	1 763.98
Carburéacteur	L	2 606.98
Charbon bitumineux étranger	Kg	2 346.83
Charbon de bois	Kg	3 231.97
Coke de charbon	Kg	2 486.83
Coke de pétrole (de valorisation)	L	3 503.68
Coke de pétrole (raffinage)	Kg	3 836.74
CRD	Kg	714.95
Déchets ligneux (résidus de bois) base sèche	Kg	1 834.97
Diesel	L	2 789.79
Écorces	Kg	1 834.97
Électricité	kWh	2 040.00
Essence (autromobile)	L	2 362.20
Essence (aviation)	L	2 459.50
Éthane	L	976.00
Éthanol (100%)	l	1 519.00
Gaz de cokerine	L	1 889.32
Gaz de distillation (de valorisation)	m3	21 496.88
Gaz de distillation (de rafinage)	L	1 756.88
Gaz d'enfouissement (portion méthane)	m3	2 177.08
Gaz naturel	m3	1 889.32
Gras animal fondu	L	2 348.00
Huile végetale	L	2 585.00
Kérosène	L	2 543.74
Lignite	kg	1 486.83
Liqueur usée de cuisson base sèche	Kg	1 313.23
Lubrifiants (huiles usées)	L	2 422.36
Matières résiduelles collectés par une municipalité	kg	1 012.03
Mazout léger no 1	L	2 652.74
Mazout léger no 2	L	2 734.74
Mazout lourd (nos 5 et 6)	L	3 146.36
Pneus	kg	2 650.00
Propane	L	1 543.98
Sous-produits agricoles (qui ne sont pas déstinés à la consomation)	Kg	1 074.00
Sous-produits de la biomasse (résidus animaux et végétaux. excllуant les résidus de bois et la liqueur de cuisson	kg	1 074.00
Vapeur	Lbs	

QA/QC procedures to be applied	Periodic review of EF published by the government. The Ministry of Energy and Natural Resources is responsible of the publications of these factors.
Purpose of data	Calculation of project emissions. estimation of baseline emissions
Calculation method	N.A.
Comments	None

4.3 Monitoring Plan

The reported monitoring plan period started at the project start date, which has been set to January 1st, 2018. In this date, all administrative decisions for land management changes, field work and data processing and modeling, needed to adjust the carbon stocks, were finished. It is important to highlight that the process for the inclusion of the first two instances of the grouped project started in August the 30th 2017 with the approval of the Integrated Planning document of FHI, defining the geographical limits and the changes in forest management coherent with the project activities. However, field data collection activities took place between November 11th and December 20th, 2017. Then, data processing and modeling to adjust growth curves in the baseline and project scenario to the conditions of each instance were carried out. The project was ready to start the monitoring of the carbon pools with the adjusted baseline growth curves by January 1st, 2018. The end of the monitoring period was defined by the start date of the carbon monitoring inventory field work on July 18th, 2022.

The organizational structure, responsibilities and competencies of the personnel that carried out the monitoring activities.

The overall responsibility of the monitoring process relies on the ECOTIERRA technical team. According to the project operational procedures, field work is conducted by the aggregator in coordination with the participant (the forest owner). In the case of the two instances monitored for carbon credits generation, FHI acts as both aggregator and participant. All monitoring activities are implemented under the supervision of a forestry professional and using predefined tools provided by ECOTIERRA.

Data manipulation, gathering, computerization for storage as well as information analysis was performed by a qualified team of ECOTIERRA. Table 13 below presents the professional participating on the monitoring process, their professional qualification, and responsibilities in the project.

Table 13. Responsibilities and competencies of the personnel carried out the monitoring activities.

Member	Professional qualifications	Responsibilities on the project
Dany Senay	Forest engineer – Forestry Strategic Advisor	• Leads the implementation and deployment of the project. • Responsible for forest management and conservation activities as well as research/development partnerships for Forêt Hereford • Leads the technical assessment of the conditions for the implementation of the project. • Leads the recruitment of aggregators and instance inclusion processes.
Luis Salgado	Forest engineer – Ecotierra's NBS and Climate Finance Director	• Supervises and guides the preparation of technical documents for the project. • Supervise data management and project calculations. • Coordinate the integration and monitoring activities during the implementation phase of the project.
Marcela Vera	Forest engineer - Ecotierra's NbS and Climate Finance Expert	• Responsible of data management and project calculations • Responsible of technical support for the drafting of reports
Camille Dionne-Pierre	Geomatician – Geomatics specialist	• Provide technical support in all GIS (Geographic information system) activities related to the project. • Provide technical support for land eligibility analysis for the instances of the project. • Support the construction of databases and drafting of thematic maps.

Member	Professional qualifications	Responsibilities on the project
		• Contribute to the integration of PIVOT into the Minka[tm] platform. in collaboration with the Minka team of Ecotierra • Optimize the automated geomatics processes
Clément Robidoux	Senior Biologist	• Responsible of the project activities for ACA
Marc-Antoine Demers	Forestry policy analyst	• Responsible of the project activities for SMB

All the methods used for generating/measuring, recording, storing, aggregating, collating and reporting the data on monitored parameters are described in the monitoring standard operational procedure. Details on the process are available in the correspondent SOP results on the implementation of these processes. The following Information on forest management s present the plot sampling location in FHI_2017_LTPF_001 and FHI_2017_ERA_001.

Figure 7. plot sampling location in FHI_2017_LTPF_001

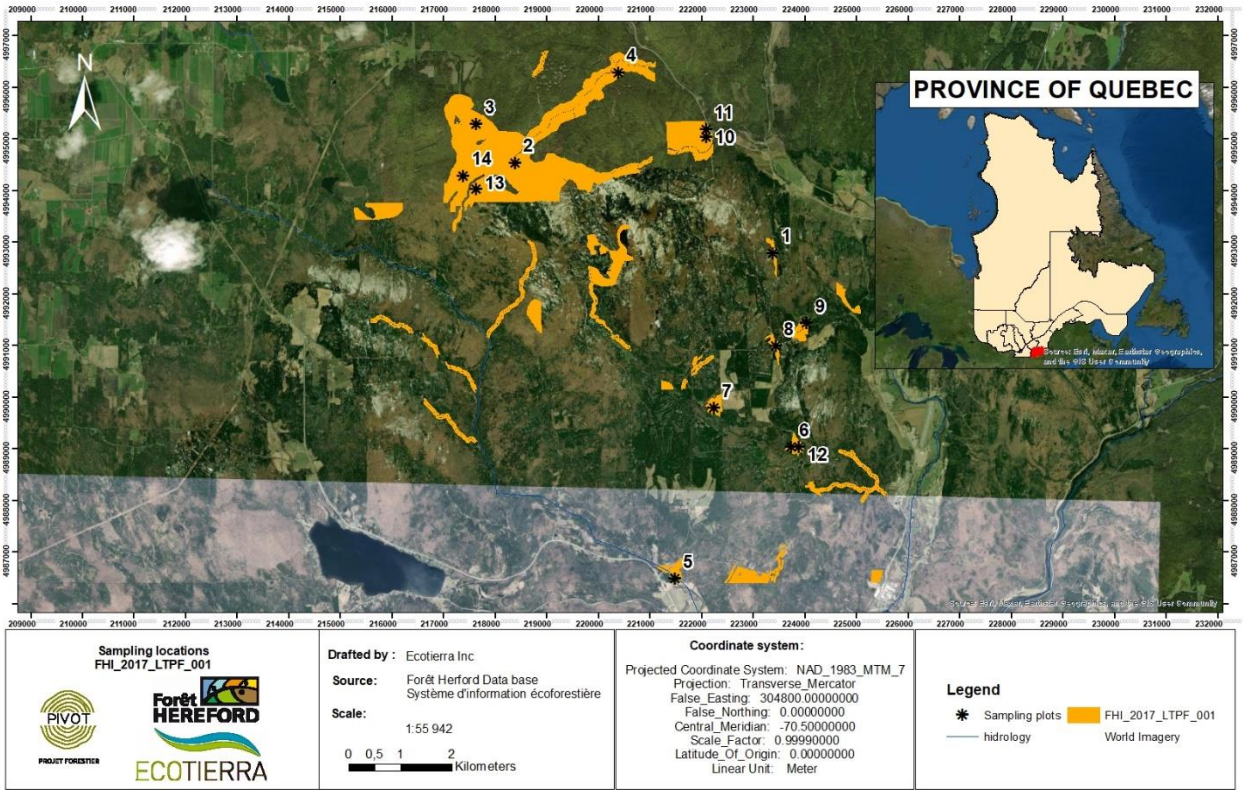
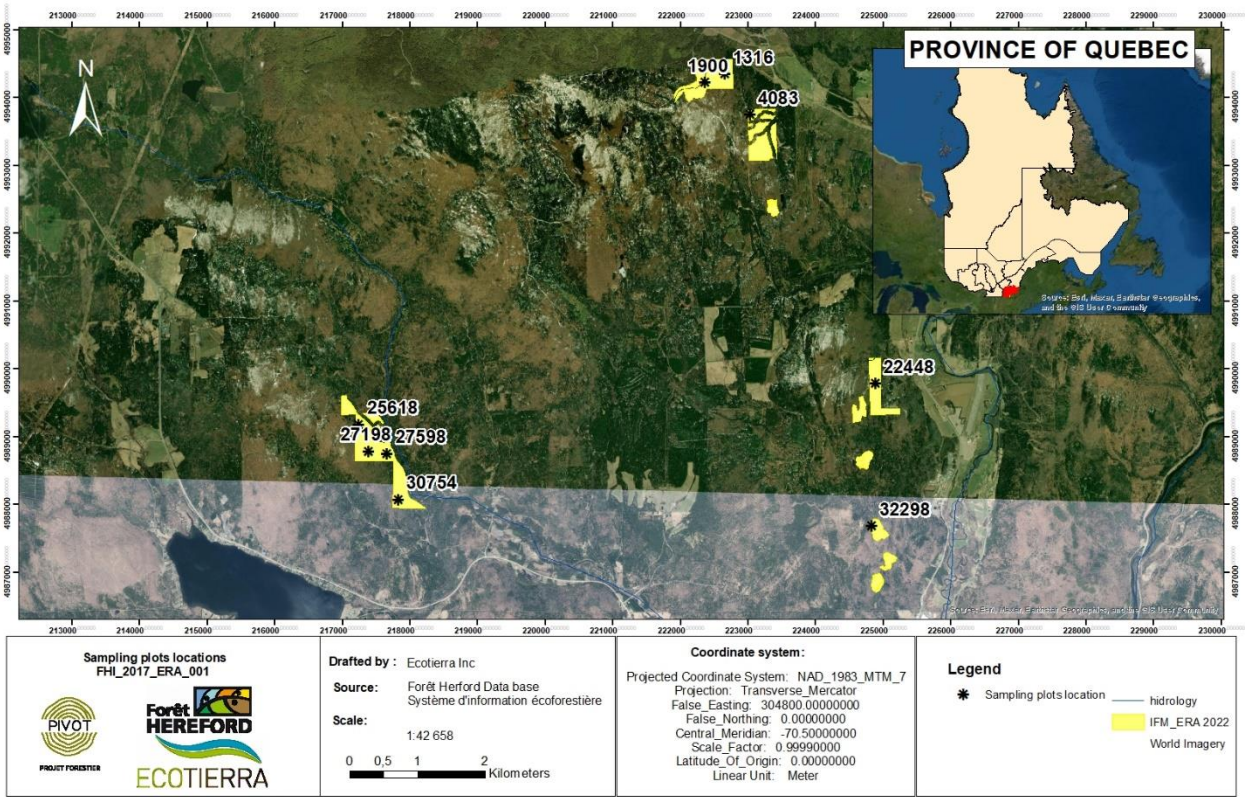


Figure 8. plot sampling location in FHI_2017_ERA_001



Pools and sources project boundary

The selection of accounted carbon pools and sources has been done following the requirements of section 5.2.2 of the selected methodology.

Table 14. - Carbon pools and sources selected for accounting GHG changes on IFM ERA and IFM LtPF activities in the instances

		Source	Gas	Included?	Justification/Explanation
IFM ERA and IFM LtPF	pool	Aboveground tree biomass	CO_2	Yes	Primary pool in the target project activities. Pool required by the methodology. Aboveground tree biomass includes large trees (equal or above 9.1 cm DBH) and small trees (below 9.1 cm DBH and over 1.3 m height)
		Belowground Biomass	CO_2	Yes	Primary pool in the target project activities. Pool defined as optional by the methodology. Belowground biomass field data is not collected and will be calculated using ABG

		Source	Gas	Included?	Justification/Explanation
					biomass and root-shoot ratios.
		Dead wood	CO_2	Yes	Important pool in the target project activities. Pool defined as optional for ERA and required for LtPF activities by the methodology
		Harvested Wood Products	CO_2	Yes	Pool required by the methodology. Harvest Wood Products are considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.
	Sources	Emissions from power equipment and transport	CO_2. CH_4. and N_2O	Yes	Important pool in the target project activities. Pool defined as optional by This source is considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.
		Emissions from biomass burning and forest fires	CH_4. and N_2O	Yes	Pool defined as optional by the methodology. However. natural forest fires could happen of the project activities. This source is considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.
		Harvested wood transport	CO_2. CH_4. and N_2O	Yes	Pool required by the methodology. This source is considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.
		Harvested wood processing	CO_2. CH_4. and N_2O	Yes	Pool required by the methodology. This source is considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.
		Harvested wood products and residuals anaerobic decay	CH_4	Yes	Pool required by the methodology. This source is considered in the monitoring. but it is no calculated because in this period no harvesting activities has been implemented.

4.3.1 Data collection of carbon content in pools in instances

Sampling plots number and Location

The standard operational procedure (SOP) used to determine the sample size was upgraded including changes on the procedure for stratification and the location of sampling plots. The sampling plans were adjusted in coherence with this upgrade, using as a base the sampling plots previously defined for the FHI instances baseline adjustment of 2017.

During the baseline adjustment process, the stratification to determine the number of sampling plots was carried out by population and age class using both instances as a unique population, considering that the initial situation was the same for both instances and the areas were geographically in the same area. For the monitoring process, as activities under PIVOT were different and to have a better sampling result, the calculation of the sampling size was done for each instance increasing the number of sampling plots. The figure below shows the location of the sampling plots for the carbon monitoring.

The number of sampling plots was determined using the Winrock's CDM A/R sample plot calculator spreadsheet. This tool calculates the number of sample plots needed to estimate terrestrial carbon stocks, based on a specified targeted precision following the methodological tool "Calculation of the number of sample plots for measurements within A/R CDM project activities" and considering the conditions of each instance and stratum present in the project and can be used for the IMF project activities.

The number of sample plots required for the estimation of biomass stocks in a carbon pool is related to the targeted precision and the variability of the biomass stock being estimated and it was determined according to values for level of errors and confidence level accepted by the CDM tool and VM0034 VCS methodology.

Stratification

For details on the stratification process for IFM activities refer to section 1.3 of the B-SOP. The initial stratification of the project is summarized in the following table:

Table 15. Ex ante stratification of the Project

Activity	Stratum at instance level	sub stratum at parcel level
ERA/LtPF	Deciduous forest	Coniferous
		Mixed
		Broadleaf

The M-SOP is based on the guidelines proposed by the selected methodology and the guidelines of Canada's NFI - Ground Sampling Guidelines. All sampling procedures are coherent with NFI procedures which are commonly used by federal and provincial government agencies. Permanent sampling plots established under the B-SOP will be used for this purpose.

Sampling plots number

The number of plots has been determined following the producer established in section 3.1 of the B-SOP.

Plot Type. Size. and Shape

Fixed-area permanent plots were selected as the most appropriate for PIVOT considering NFI procedures and that these plots will be used over an extended period for monitoring purposes. The plot size selected for each attribute follows NFI procedures and will be maintained throughout the monitoring time frame.

Ground plot attributes are measured in four components:

1. Site information
2. Big Trees measurements
3. Small Trees measurements
4. Dead wood measurements

Sampling plot's location

Monitoring plots will use the same location as the plots defined using the B-SOP for the same instance. Sampling plot location procedure is detailed in section 3.2.1 of the B-SOP document. Map location and the geographical position (GPS coordinate) will be available in MINKA. This way the plots position can be loaded on the GPS receptors and used by the sampling crews to reach the plot accurately.

The location of the permanent sample plots is a systematic sample method is used. This method implies a quadrangular fixed grid to assign plots in a regular pattern. All the process is developed using the GIS software tool "Create fishnet" of the Data management tools. Defining the value of the cell size implies to intersect the shp.file of the fishnet's central points with the shp.file of the forest stratum (Coniferous, mixed, broadleaf). This step allows to identify which points are inside in each forest stratum and substratum (Class age) polygons. The total number of points per stratum will be compared with the number of plots defined with Winrock's CDM A/R sample plot calculator.

The final location of the plots will be defined systematically as described below:

1. The total number of points per class-age will be divided by the number of plots per sub-stratum defined in Winrock's calculator.
2. The resulting number of this division (X) will determinate which point of the list will be assigned as plot, it means that each X points, one is chosen to be a plot.

The calculated number of plots for this class-age shows was 4. The fishnet provided 62 total points in the stratum were dived by 4. The result of this division is 15 which means that each 15th point of the "broadleaf Age_ Jin" class-age will be defined as a sampling plot.

Plot Design

The monitoring plot design is coherent with the NFI and adapted to the monitoring needs of the project, having as final objective to maximize efficiency and get relevant information.

Plot design criteria follows the core plot design illustrated in Figure 9 and is comprised of two concentric, circular plots with two lines transect, perpendicular to each other, running through the plot center. Core plot design components include:

- **A large tree plot (LTP).** with a radius of 11.28 m and an area of 400 m^2 (0.04 ha), for measuring attributes of large trees (trees with DBH ≥ 9.1 cm).
- **A small tree plot (STP)** with a radius of 3.99 m and area of 50 m^2 (0.005 ha), for measuring small trees (trees ≥ 1.3 m in height with a DBH < 9.0 cm). and stumps (< 1.3 m in height).
- **Two line transects.** 30.0 m long. for measuring dead wood.

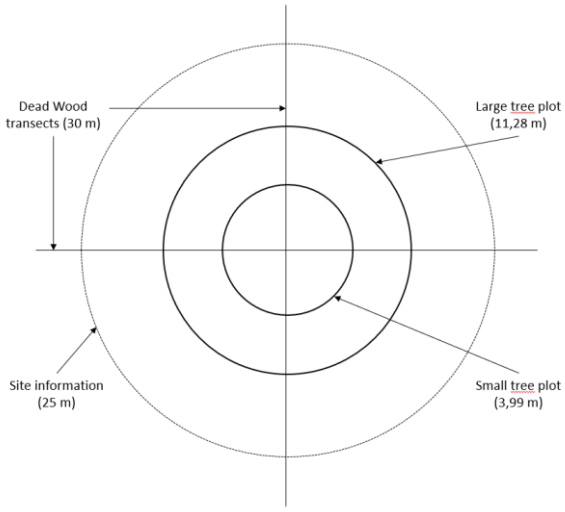


Figure 9. Ground plot design.

In coherence with the NFI sampling design, each sampling plot is considered an integrated monitoring plot with its center located at the center of the LTP.

The plot center will be the location around which the sample information will be collected. All attributes are attached to the plot center point. Data is collected on the following major items using the sampling methods listed.

Table 16. Summary of data collected at the plot center and the sampling method employed.

Data	Plot type
Site information	25 m radius visually estimated plot
Large tree attribute (alive and dead)	11.28 m radius fixed-area plot
Small tree attribute	3.99 m radius fixed-area plot
Stumps	3.99 m radius fixed-area plot
Lying dead wood attribute	Two 30 m long transects

Field Equipment

Prior to the start of the forest inventory, the equipment used to collect data during the field work will be checked and calibrated. This includes measuring tapes, caliper, GPS, and all other equipment. The checklist in Appendix B of the B-SOP document identifies each ground plot sampling component and the sampling equipment necessary to complete the field measurements. The crew will ensure that every instrument is calibrated and that the proper parameters are entered, such as parcels positioning. GPS maps etc.

Establishing the Sampling Plots

The work sequence for establishing the sampling plots after the plot center pin is as follows:

- GPS data is collected to confirm monitoring plot location.
- Crew members establish various plots and transects.
  - Establish and mark the line transects. The crew usually places two measuring tapes or premeasured ropes (secured at either end of the transect) on or close to the ground on the pre-determined bearings.
  - Measure and mark quadrant lines with ribbon markings at 3.99 and 11.28 m.
  - Measure and mark any intermediate points between the sector and quadrant lines as needed on 3.99 and 11.28 m plots.
  - As the 11.28 tree plot is being marked, measure any borderline trees along the plot boundary.

At this point. large tree plot boundary (with sectors) and transects have been established. The members of the crew can now see the areas of the various plots and transects and take extra care not to disturb these locations as other work progresses.

Site information is assessed last, when everyone has a thorough knowledge of the site. Disturbance, treatment, and origin information are related to data collected within the boundaries of the Large tree plot and should therefore be interpreted within the boundaries of the Large tree plot.

The typical monitoring crew will include a forest professional or technician or a professional with relevant knowledge of the forest and forest inventories (crew leader) and two assistants able to assist in completing all aspects of the sample.

The preceding sequence of events can change dependent upon site conditions. Each sample location and the sequence of establishing the plots need to be evaluated once the crew is on site.

Data collection

Field formats used to collect data were created in the app Kizeoforms[73] according to the original forms included in B-SOP and M-SOP. The data from Kizeoforms is downloaded in excel format for data management and calculations purposes.

Quality Assurance / Quality Control

To reduce the uncertainties and the probability of errors during the sampling and data management process. Ecotierra has been implemented quality assurance / quality control procedures for routinely check for data consistency, correctness, and completeness; for identifying and correcting errors and omissions; and for properly documenting and archiving data and documentation related with the monitoring activities. Field teams in charge of the QA/QS activities are supervised and supported by a Forestry Engineer member of the project team.

Following the QA IPCC Good Practice Guidance for LULUCF. 2003, it is applied the following controls:

Data collection in field: All field crews are forestry professionals with experience in forestry inventory and trained in carbon monitoring practices. Every crew is under the supervision of a Forestry Engineer member of the project team that will validate the qualifications of each crew member.

[73] https://www.kizeo-forms.com/fr/

Test sample plots have been carried out in place to ensure that training can be conducted and to ensure learning by measuring all relevant components. A crew chief observed each field crew member during data collection of a parcel to verify measurement processes and correct immediately any errors in techniques or any systematic measurement errors. Any errors or misunderstandings could this way be explained and corrected. All staff responsibilities have been clearly defined and raising awareness about the importance of each task for producing reliable results.

Kizzeo Forms includes a "Data recorded by" field with the name of the crew member responsible for recording data[74]. If any confusion existed, it is clear which crew member was contacted. Before leaving each plot. The crew chief double checked to make sure that all data was correct and filled in. The crew chief ensured the data recorded matches with field conditions.

Check of data in Kizzeo forms: At the end of each day all kizzeo forms were checked by crew chiefs to ensure that all the relevant information was collected. If for some reason, there was some information that seemed odd or was missing. mistakes were corrected the following day.

Every 10 plots, parameters will be re-measured and checked by another crew independently and measurements compared for errors. Any errors will be explained. corrected and recorded. These new measurements on permanent plots are intended to verify that the measurement procedures were performed correctly.

- Data Entry checks

To ensure that data is entered (registered) correctly. The person entering it rechecked all the data entered (registered) and compared it with the original data sheet before entering another sheet. Communication between all personnel involved in measuring and analyzing data will be used to resolve any apparent anomalies before final analysis of the monitoring data can be completed.

A random check was made on over 10 % of the data entered in the database. If there were any problems that couldn't be resolved with one of the plot data. The plot was not used in the analysis.

[74] If electronic sheets are use, the same procedure will be used to identify the crew chief and crew member responsible of the field work.

Documents showing that these procedures were followed will be archived along with the project documentation. The document included a list of members of the field team and the project leader will certify that the crew members were trained.

- Monitoring system (MINKA & GIS)

A Geographic Information System is implemented with the following basic layers:

- Site maps based on aerial photographs. lidar images satellite images or other sources.
- Project boundaries.
- Eco forestry information provided by SIEF.
- Identification of each instance with its initial stratification and is projected management pattern (project stratum).
- Permanent sampling plot's location.
- Other layers may be added in the future.
- Storage: All digital data included is kept on two physical hard disks and a space on the Web.

4.3.2 Data management and calculations of carbon content in pools

The data management and calculation are done following the monitoring plan and the corresponding SOP for the different pools:

Total large tree biomass

According to IPCC (2006), plant biomass constitutes a significant carbon stock in many ecosystems. Biomass is present in both aboveground and below-ground parts of annual and perennial plants. The above ground tree biomass was calculated using the Artemis model in the case of instances FHI_2017_ERA_001 and FHI_2017_LTPF_001. Artemis is a growth model used for instances located in the deciduous forest strata in the province of Quebec.

Artemis calibrates a growth model using an individual stem approach and has been used extensively by private and public organizations in the Quebec province. The model considers stems of commercial or non-commercial trees species whose diameter at breast height is greater than or equal to 9.1 cm. Using Artemis. PIVOT predicts gross merchantable volume, i.e. the volume from the stump height (15 cm) to the end diameter of 9 cm with bark using the dbh of the tree, its species and the height obtained using an Artemis sub-model.

Artemis allows PIVOT to work with "stratum identifiers" indicating the strata that corresponds to each input file. Each instance is stratified by forest population (conifers, mixed, broadleaf), as well as forest

age class, data management and calculations as done following these "stratum identifiers" up to the sub-srata level. Artemis results in commercial volume (m^3 ha^{-1}) were converted to above ground biomass (T.d.m ha^{-1}) using biomass conversion and expansion factor for expansion of merchantable growing stock. The results of using the Artemis model are available for review by the VVB. Belowground biomass was calculated with the ratio of below-ground biomass to above-ground biomass default factor. All this process was done using the equation below:

$$C = \sum_{i.j}(A_{j.i} * V_{j.i} * BCEFs_{j.i} * (1 + R_{j.i}) * CF_{j.i} \qquad \text{(Equation 1)}^{75}$$

Where:

C = total carbon in biomass for time t_2 (Verification period). tC

A = area of land remaining in the same land-use category. ha (instance sub-strata classified by forest population and age class)

V = merchantable growing stock volume m^3 ha^{-1}

i = project strata i (i = 1 to n)

j = project sub-strata j (j = 1 to m) (instance sub-strata by forest population and age class)

BCEFs = biomass conversion and expansion factor for expansion of merchantable growing stock volume to above-ground biomass. tonnes above-ground biomass (m^3 growing stock volume)-. Dimensionless.

R = ratio of below-ground biomass to above-ground biomass. Dimensionless.

CF = carbon fraction of dry matter. Dimensionless.

Area (ha)

As it was mentioned before an eligibility analyse of the areas is done in the instance inclusion process. With the georeferenced information of the areas sent by the aggregator. ECOTIERRA proceeds to carry out:

- The verification of municipal regulations concerning tree harvesting.
- Exclusion of areas with a conservation status

75 Equation 2.8 annual change in carbon stocks in biomass in land remaining in the same land-use category (stock-difference method) of Chapter 2 of generic methodologies applicable to multiple land-use categories. 2006 IPCC Guidelines for National Greenhouse Gas Inventories Volume 4 Agriculture, Forestry and Other Land Use. Available at: https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf

- Exclusion of certain areas not to be included in Pivot.
- ECOTIERRA removes the wetlands and the non-eligible zones based on Ecoforest Information System (*Systeme d'information ecoforestier.* SIEF) and prepares a draft of Eligibility Assessment Report and the document of preliminary engagement.

The result of this analysis for each of the instances is presented below:

Table 17. Area (ha) per forest sub-strata (population and age class) in FHI_2017_ERA_001

	Age class					
Forest sub-strata	0-20	21-40	41-60	61-80	81+	TOTAL
Conifers	0.2	0.2	1	0	0	1.4
Mixed	7.1	5.6	34.3	0	0	47
Broadleaf	12.8	10.1	62.2	0	0	85.2
TOTAL	20.1	15.9	97.5	0	0	**133.6**

Table 18. Area (ha) per forest sub-strata (population and age class) in Foret Herford – FHI_2017_LTPF_001

	Age class					
Forest sub-strata	0-20	21-40	41-60	61-80	81+	TOTAL
Conifers	1.1	0.7	18	0.2	0.5	20.5
Mixed	17.7	10.4	284.5	2.8	8.3	323.7
Broadleaf	17.7	10.3	281.7	2.8	8.2	320.7
TOTAL	36.5	21.4	584.2	5.8	17	**664.9**

Merchantable growing stock volume ($m^3.ha^{-1}$)

As mentioned before, Artemis predicts gross merchantable volume based on field data, allowing to consolidate and compute data according to the forest population (conifers, mixed, broadleaf) and forest class age. The following tables shows the commercial volume per hectare in each sub-strata. In cases were no field data existed for a sub-stratum, the commercial volume for the same age class from other forest population was taken.

Table 19. Commercial volume($m^3.ha^{-1}$) per forest sub-strata - FHI_2017_ERA_001

CONIFERS		MIXED	BROALEAF
Age class	Commercial Volume. ($m^3.ha^{-1}$)	Commercial Volume. ($m^3.ha^{-1}$)	Commercial Volume. ($m^3.ha^{-1}$)
10	34.0	34.0	34.0
30	37.7	37.7	37.7
JIN+50	142.2	86.9	173.1
61-80	252.9	173.1	173.1
81+	252.9	173.1	173.1

Table 20. Commercial volume per forest sub-strata - Foret Herford – FHI_2017_LTPF_001

CONIFERS		MIXED	BROALEAF
Age class	Commercial Volume ($m^3.ha^{-1}$)	Commercial Volumen. ($m^3.ha^{-1}$)	Commercial Volume ($m^3.ha^{-1}$)
10	98.2	34.0	98.2
30	136.6	37.7	136.6
JIN+50	113.6	86.9	132.5
61-80	99.0	173.1	132.5
81+	99.0	173.1	132.5

Ratio of below-ground biomass to above-ground biomass (R)

Following the recommendation of IPCC (2006), PIVOT uses the relation factor between aboveground biomass and belowground biomass, to calculate the underground biomass. Table 4.4. of the Forest land chapter (IPCC, 2006) guide provides values used by the project depending on the type of vegetation and the amount of above-ground biomass.

Table 21. RATIO OF BELOW-GROUND BIOMASS TO ABOVE-GROUND BIOMASS

Aboveground category	Value
<50 tonnes ha^{-1}	0.4
50 -150 tonnes ha^{-1}	0.3

>150 tonnes ha^{-1}	0.2

Biomass conversion and expansion factor for expansion of merchantable growing stock volume to above-ground biomass (Tonnes above-ground biomass, BCEFS)

As BCEFS values derived locally and based directly on merchantable volume are not available. PIVOT uses an alternative procedure suggested by IPCC using biomass expansion factor (BEFS) and D values as follows:

$$BCEFS = BEFS \bullet D$$

Average wood density values by strata were used to transform merchantable volume (Table 22). The average was generated from data of IPCC (2003) and Gonzalez (1990).

Table 22. Average wood density by strata

Project Strata	Average wood density (dry matter tonne / fresh volume)
Continuous boreal forest	0.43
Mixed Forest	0.45
Deciduous forest	0.47

The biomass expansion factors were taken from Table 3.A.1.10 “Default values of biomass expansion factors (BEFS)” of IPCC (2006).

Table 23. Default values of biomass expansion factors (BEFs)

	Sub-strata (Forest population)		
Strata	Conifer	Mixed*	Broadleaf
Boreal	1.35	1.33	1.30
Mixed	1.30	1.35	1.40
Deciduous	1.30	1.35	1.40

*Average of conifer and broadleaf data

The carbon fraction default value (0.5) and the relation between molecular mass of carbon and carbon dioxide (44/12) were used to convert dry biomass to carbon at the instance level. The result of this procedures is presented in the following tables:

Table 24. Total carbon content (tCO_2e) in large tree by forest population and age class in FHI_2017_ERA_001

	Age class					
Sub-strata (Forest population)	1-20	21-40	41-60	61-80	81+	Total
Conifers	4	4	94	-	-	102
Mixed	848	744	10,115	-	-	11,707
Broadleaf	1,536	1,347	29,977	-	-	32,860
Total tCO_2e						44,567

Table 25. Total carbon content (tCO_2e) in large tree by forest population and age class in FHI_2017_LtPF_001

	Age class					
Sub-strata (Forest population)	1-20	21-40	41-60	61-80	81+	Total
Conifers	376	523	8 082	60	176	9 217
Mixed	5 942	4,813	109 590	950	2 775	124,071
Broadleaf	5,884	4,765	94 538	941	2 748	108,876
Total tCO_2e						242,164

Total small tree biomass

As the Artemis model does not consider small trees, aboveground biomass content for small trees is calculated using generic allometric equations from IPCC[76] for estimating aboveground biomass (kg.d.m. matter per tree) for temperate hardwood and pine species.

A search for specific biomass allometric equations for the province of Quebec or Canada was carried out. Nevertheless, the two sources found (Lupi et al 2015[77] and M.-C. Lambert et al 1996[78]) were discarded as they were not suitable for the range of diameters collected and the lack of availability of statistical parameters required for some of these equations.

[76] Annex 4A.2 Examples of allometric equations for estimating aboveground biomass and belowground biomass of trees. Chapter 4: Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol. IPCC Good Practice Guidance for LULUCF (20004). Available in: https://www.ipcc.ch/site/assets/uploads/2018/03/GPG_LULUCF_FULLEN.pdf

[77] Lupi et al 2015. Evaluating sampling designs and deriving biomass equations for young plantations of poplar and willow clones. Available in : https://www.sciencedirect.com/science/article/abs/pii/S0961953415301094#:~:text=Evaluating%20sampling%20designs%20and%20deriving%20biomass%20equations%20for%20young%20plantations%20of%20poplar%20and%20willow%20clones

[78] M.-C. Lambert et al 1996. Canadian national tree aboveground biomass equations. Available in: https://cdnsciencepub.com/doi/abs/10.1139/X05-112

In this context, the following equations were used for this pool.

Table 26: Generic allometric equations from IPCC[79]

Equation	Tree groups	R2/Sample size	DBH range (cm)
$Y = 0.887 + ((10486 * (DBH)^{2.84})/((DBH)^{2.84} + 376907))$	Temperate pines	0.98 / 137	0.6 - 56
$Y = 0.5 + ((25000 * (DBH)^{2.5})/((DBH)^{2.5} + 246872))$	Temperate hardwoods	0.99 / 454	1.3 - 83.2

Where:

Y= aboveground dry matter. kg (tree)$^{-1}$
DBH =diameter at breast height. cm

Following the aboveground biomass calculation using the selected allometric equations, the calculation of belowground biomass was performed using the same value of root-shoot-ration used for large trees. As well as the conversion of biomass in terms of kg (tree) to carbon and later to carbon dioxide tCO_2e. The calculations are made at the scale of the monitoring plot and were then extrapolated to the hectare.

Table 27 presents the result for carbon stock estimation in small trees for instance FHI_2017_LTPF_001.

Table 27. Carbon stock (tCO_2e) in small trees for instance FHI_2017_LTPF_001

Monitoring Plot number	Carbon content (tCO_2e per plot)
3	0.0
4	0.0
5	0.0
6	0.0
7	0.0

[79] Annex 4A.2 Examples of allometric equations for estimating aboveground biomass and belowground biomass of trees. Chapter 4: Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol. IPCC Good Practice Guidance for LULUCF (20004). Available in: https://www.ipcc.ch/site/assets/uploads/2018/03/GPG_LULUCF_FULLEN.pdf

9	0.4
10	0.1
11	0.0
12	0.0
13	0.0
14	0.1
15	0.1
16	0.1
17	0.1
Average carbon (tCO_2e $plot^{-1}$)	**0.1**
tCO_2e ha^{-1}	**11.1**

Table 28 presents the result for carbon stock estimation in small trees for instance FHI_2017_ERA_001.

Table 28. Carbon stock (tCO_2e) in small trees for instance FHI_2017_ERA_001

Monitoring Plot number	Carbon content (tCO_2e per plot)
1316	0.0
1900	0.0
4083	0.2
22448	0.1
25618	0.0
27198	0.2
27598	0.3
30754	0.0
32298	0.0
Average carbon (tCO_2e $plot^{-1}$)	**0.1**
tCO_2e ha^{-1}	**21.8**

Deadwood Biomass

Stumps

To calculate the carbon stock in this pool. PIVOT used AR-TOOL12 of CDM[80]. Estimation of carbon stock in standing dead wood in tree stumps uses the following equation:

$$C_{DWS_{STUMP.j.p.i.t}} C_{DW\ \ STUMP.j.p.i.t} = \frac{44}{12} * CF_{tree} * \left(1 + R_j\right) * \frac{\pi}{4} \sum_{k}^{\infty} \left(D_{MID_{STUMP}.k} 2\right) * H_k * DWD_{\text{DWT}}$$

(Equation 2)[81]

Where:

$C_{DWS_{STUMP.j.p.i.t}}$= Carbon stock in dead wood in dead tree stumps of species *j* in sample plot *p* in stratum *i* at a given point of time in year *t*; t CO_2e

CF_{tree}= Carbon fraction of tree biomass; dimensionless.

R_j =Root-shoot ratio for tree species *j*; dimensionless.

D_{MID_STUMP}= Mid-height diameter of the dead tree stump;

H_K= Height of the k^{th} dead tree stump of species *j* in plot *p* in stratum *i* at a given point of time in year *t*; m.

$DWD_{DD.G.DWT}$ = Wood density by decay class (DC). tree group (G) and deadwood type (DWT).t.m^{-3}

The values used for wood decay were as follows:

[80] AR-TOOL12 A/R Methodological tool: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities. Version 03.1. Available in: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-12-v3.1.pdf

[81] Equation (5) of AR-TOOL12 A/R Methodological tool: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities. Version 03.1. Available in: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-12-v3.1.pdf

Table 29. Wood density by decay class (DC). tree group (G) and deadwood type (DWT)

Deadwood type	Group	Decay Class Group - Mean density (t/m³)		
		1	2	3
Lying deadwood	Coniferous	0.5	0.2	0.1
	Broadleaf	0.4	0.2	0.1
Standing deadwood	Coniferous	0.4	0.3	0.2
	Broadleaf	0.4	0.4	0.3
Stump	Coniferous	0.3	0.2	0.1
	Broadleaf	0.4	0.3	0.2

Deadwood Lying

Following AR-TOOL12 of CDM. estimation of carbon stocks in lying dead wood uses the following equation:

$$C_{DWL_{.j.p.i.t}} = a_{PLOT} * \frac{44}{12} * CF_{tree} * D_{\text{DWDDC.G.DWT}} * \frac{\pi^2}{8L} \sum_{k}^{\infty} (D_n 2) \qquad \text{(Equation 3)}^{82}$$

Where:

$C_{DWL_{.j.p.i.t}}$ = Carbon stock in lying dead wood of species *j* in sample plot *p* in stratum *i* at a given point of time in year t; t CO_2e.

a_{PLOT} =Area of the sample plot *p*; ha.

CF_{tree} = Carbon fraction of tree biomass; dimensionless.

L = Sum of the lengths of the transect lines approximately orthogonally bisecting each other at the centre of the plot *p*; m.

$D_{n=}$Diameter of the $_{n^{th}}$ piece of lying dead wood intersecting a transect line; cm.

[82] Equation (6) of AR-TOOL12 A/R Methodological tool: Estimation of carbon stocks and change in carbon stocks in dead wood and litter in A/R CDM project activities. Version 03.1. Available in: https://cdm.unfccc.int/methodologies/ARmethodologies/tools/ar-am-tool-12-v3.1.pdf

In PIVOT's forestry inventory. along each transect different sizes of dead wood will be measured in 10 m increments as follows:

- 0 to 10 m: Large dead wood (LDW) and Medium dead wood (MDW)
- 10 to 20 m: LDW
- 20 to 30 m: LDW and MDW

There for the sum of length will be as it established in the following table:

Table 30. Sum of the lengths of the transect lines according to PIVOT'S forestry inventory.

Transect code	Transect length (m)
LDW	60
MDW	40

For accumulation or odd shaped pieces. the following equation from the Canadian Nation Forestry Inventory (NFI) methodology was taken to get diameter parameters required in the analyzed equation (Equation 4).

$$\text{EQ\_DIAMETER}_{mpzw} = \sqrt{\frac{\text{HOR\_LENGTH}_{mpzw} * \text{VER}_{\text{DEPTH}_{mpzw}} * 4}{\pi}} \quad \text{(Equation 4)}^{83}$$

Where :

$\text{EQ\_DIAMETER}_{mpzw}$ = Round-diameter equivalents to cross sectional area

HOR_LENGTH_{mpzw} = Length along the transect of each odd-shaped piece of woody debris. For accumulations, measure the distance along the transect to the nearest centimeter.

$\text{VER}_{\text{DEPTH}_{mpzw}}$ = Average depth along the transect of the odd-shaped piece of woody debris. For accumulations, record the average depth. visually compress the pile and not measure spaces between pieces.

[83]See equation in page 53 of the National Standards for Ground Plots Compilation Procedures Version 2.4. Available in: https://nfi.nfis.org/resources/groundplot/GP_compilation_procedures_2.4.pdf

$\mathrm{DWD}_{DC.G.DWT}$ = Result of multiplying the density reduction factor β_k by the basic wood density (see Table 29):

$$\mathrm{DWD}_{DC.G.DWT} = \beta_k * D_j$$

Where:

β_k= Density reduction factor applicable to the k[th] dead tree stump of species j in plot p in stratum i at a given point of time in year t; dimensionless

D_j =Basic wood density of species j; t d.m. m^{-3}

For the instance FHI_2017_ERA_001, the carbon stock in deadwood stumps and deadwood lying were 0.1 tCO_2 ha^{-1} and 14.9 tCO_2 ha^{-1}. respectively. For the instance FHI_2017_LtPF_001 the carbon stock in these same pools were 0.2 tCO_2ha^{-1} and 13.4 tCO_2ha^{-1}. respectively.

4.3.3 Data collection to calculate GHG emissions from sources:

Collection data

Every year the aggregator must answer the annual monitoring questionnaire[84], which aims to identify the sources of emissions associated with the collection of wood in the ERA project activity:

- Information Pre-commercial or harvesting activities:
  - ✓ Data collection date.
  - ✓ Species
  - ✓ Volume
  - ✓ Percentage of the harvest carried out in the plot.
  - ✓ equipment used.
  - ✓ used fuels.
  - ✓ Fuel Quantities

Additionally, the natural disturbances are identified by defining the affected surface and the severity of the damage. In addition of identifying the amount of wood collected for personal use.

[84] Series of FH monitoring questionaries 2019,2020,2021, July 2022. (Available in: FHI_2017_ERA_001\Monitoring GHG sources)

$\Delta TE_{BS.t}$is determined for each relevant GHG source as follows:

$$\Delta TE_{BS.t} = \sum_j (TE_{BSj.t} - TE_{BSj.t-1}) \quad \text{(Equation 5)}^{85}$$

Where:

Parameter	Description	Default Value
$\Delta TE_{PA.t}$	The net incremental GHG emission reductions by baseline sources of emissions achieved by the baseline during reporting period t. A net increase in total emission reductions is expressed as a positive number. Expressed in tonnes of CO_2e	N/A
$TE_{BSj.t}$	The total GHG emissions by source j, under the baseline scenario during reporting period t. Expressed in tonnes of CO_2e	
$TE_{BSj.t-1}$	The total GHG emissions by source j. under the baseline scenario during reporting period t-1. Expressed in tonnes of CO_2e	

4.3.3.1 Emissions from fossil fuel production

The emissions factors used in section 4.1.3 were determined from – cradle-to-grave activities. Therefore, emissions from fossil fuel production are considered in section 3.1.3.4

4.3.3.2 Emissions from fertilizer production

Silvicultural practices in the baseline and project scenario do not considered fertilization. Therefore, no emission from this source will be considered.

4.3.3.3 Emissions from transport of material. equipment. inputs. and personnel to site and emissions from harvested wood transport[86] to site

Emissions from transportation of materials, equipment, inputs, and personnel to the baseline site as well as transportation of harvested wood to primary transformation facilities are to be calculated using the following equation:

85 Equation 33 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

86 Transport of primary HWPs to the location of use, as part of BE11 will be considered as zero both on the baseline and project scenarios. This is a conservative measure as baseline emission from this source will be reduced by the project.

$$GHG_{j.PE3/BE3.t} = \sum_m (EF_{m.j} \times AL_{m.t} \times CF_m)$$ (Equation 6)[87]

Where:

Parameter	Description	Default Value
$GHG_{j.PE3/BE3.t}$	Emissions of GHG j, from transportation of materials, equipment, inputs and personnel to the project / baseline site during reporting period t. Expressed in t.	N/A
$EF_{m.j}$	Emission factor (EF) for transportation mode m and GHG j. Expressed in t/unit of transported material using transportation mode m.	N/A
$AL_{m.t}$	The quantity of materials, equipment, inputs, and personnel transported by mode m during reporting period t. Expressed in units of transported material: persons, items or tonnes, as appropriate.	N/A
CF_m	The conversion factor to be used if the units of the activity level do not match those of the emission factor for transport mode m. Where both the activity level and emission factor are expressed in the same units. CF would be set to 1. Dimensionless.	N/A
J	The relevant GHGs in this methodology: CO_2. CH_4 and N_2O	N/A
T	The reporting period in question, where the value of t indicates the number of reporting periods that have occurred since the start of the project up to the reporting period in question.	N/A
M	Transportation mode	N/A

To define the quantity of fuel used by the activity. data published by Canadian Natural Resources ministry in a document named “Status of energy use in Canadian wood products sector” was used[88]. As this report documents the cradle-to-gate energy use in the production of the five commodities (lumber, plywood, oriented stand board manufacture, composite panel board and MDF) and the methodology considers four commodities the following equivalence was used for the proposed project.

87 Equation 12 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

88 GHG emissions related to transport of material, equipment, inputs and Personnel to Site and Harvested Wood Transport, are reported under the resource extraction, forest management and resource transportation categories.

Table 31 - Equivalence between VM0034 methodology and Government of Canada' commodities classification.

Methodology	Government of Canada
Lumber mills	Lumber
Plywood mills	Plywood
Chip mills	
Panel mills	Oriented stand board manufacture
	Composite panel board manufacture
	MDF manufacture

Table 32 - Lumber and chip mills' energy use in resource extraction, forest management and resource transportation of lumber mills and chipmills

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	7.0
Liquid propane gas (LPG)	L	0.0
Electricity	kWh	0.1
Diesel fuel (hauling)*	L	7.6

Table 33 - Ply mills' energy use in resource extraction, forest management and resource transportation

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	3.7
LPG	L	0.0
Electricity	kWh.	0.0
Diesel fuel (hauling)	L	5.6

Table 34 - Panel mills' energy use in resource extraction, forest management and resource transportation

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	1.3
LPG	L	0.0

Electricity	kWh	0.0
Diesel fuel (hauling)	L	9.7

Emission factors used were published by the Quebec Government - Office of Energy Efficiency and Innovation (2017)[89].

4.3.3.4 Emissions from fossil fuel combustion in vehicles and equipment

Emissions from primary processing of harvested wood are to be calculated using the following equation.

$$GHG_{j.PE4/BE4.t} = \sum_f \left[\sum_e \left(EF_{f.e.j} \times AL_{f.e.t} \times CF_{f.e} \right) \right]$$ (Equation 7)[90]

Where:

Parameter	Description	Default Value
$GHG_{j.\ PE4/BE4.\ t}$	Emissions of GHG j, from on-site vehicles and equipment fossil fuel combustion during reporting period t. Expressed in t GHG j.	N/A
$EF_{f.\ e.\ j}$	The emission factor for GHG j, fuel type f and equipment/vehicle type e (eg. tonnes CO_2 per L diesel]. Expressed in t/unit of fuel.	See below under the title "Determining the emission factor" the emission factor requirements
$AL_{f.\ e.\ t}$	The quantity of fuel of type f combusted in equipment/vehicle type e during reporting period t. Expressed volumetric measure (eg, l, m^3, etc.) or mass measure (kg, t, etc.) with appropriate conversion.	N/A

89 Bureau de l'efficacité et de l'innovation énergétiques (2017). Biomasse forestière résiduelle. Publications et formulaires. Facteurs d'émissions. Available in: https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/FacteursEmission.pdf

90 Equation 16 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf.

$CF_{f.e}$	The conversion factor to be used if the units of the activity level do not match those of the emission factor for a particular fuel type f and equipment/vehicle type e. Where both the activity level and emission factor are expressed in the same units. CF would be set to 1. Dimensionless.	N/A
J	The relevant GHGs in this methodology: CO_2. CH_4 and N_2O	N/A
T	The reporting period in question, where the value of t indicates the number of reporting periods that have occurred since the start of the project up to the reporting period in question.	N/A
F	Fuel type	N/A
E	Equipment/vehicle type	N/A

Data published in the document "Status of energy use in Canadian wood products sector" include the harvest wood processing classified by wood type manufacture (Lumber, ply mills, panel mills). Therefore, the quantity of fuel or energy used to process one cubic meter of harvested wood by manufacture category of wood harvested is taken.

Table 35 - Energy use in lumber manufacture

Fuel type in physucal units	Unit	Lumber manufacture (per m^3)
Electricity	kW.h	70.83
LPG	L	0.19
Diesel	L	2.57
Natural gas	m^3	6.09
Gasoline	L	0.06
Hog fuel (internal)	kg	40.96
Steam (hog fuel) from pulp	MJ	127.29

Table 36 - Energy use in plywood manufacture

Fuel type in physical units	Unit	Plywood manufacture (per m^3)
Electricity	kW.h	103.21
LPG	L	0.27
Diesel	L	1.23
Natural gas	m^3	15.77
Gasoline	L	0.03

Hog fuel	kg	72.42

Table 37 - Energy use in panel manufacture

Fuel type in physical units	Unit	Plywood manufacture (per m^3)
Electricity	kWh	228.90
LPG	L	0.34
Diesel	L	2.30
Natural gas	m^3	15.55
Gasoline	L	0.01
Hog fuel	kg	118.12
Fuel oil	L	0.13

The quantity of fuel or energy used in these activities for chip mills was determined using data from the report ¨Benchmarking energy use in Canadian pulp and paper mills published by Canadian government (2008)[91]. Chips are used to manufacture kraft, newsprint, printing and writing paper, as well as recycled paper. To determinate the quantity of chips that goes to each product category data from Quebec's government (2010)[92] was used.

Table 38 - Type of pulp produced by Québec's pulp and paper industry (mt. 00s)

Type of product	mt[93]	Proprotional distribution
Newsprint	3036	40%
Printing and writing paper	2,558	33%
Sanitary tissue	334	4%
Other papers	266	3%
Paperboard	1,446	19%

91 Canada Government (2006). Benchmarking energy use in Canadian pulp and paper mills. Available in : https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oee/pdf/industrial/technical info/benchmarking/pulp-paper/pdf/benchmark-pulp-paper-e.pdf

92 https://mffp.gouv.qc.ca/english/publications/forest/publications/stat_edition_resumee/chap11a10.pdf

93 Metric ton

Table 39 - Energy consumption of kraft manufacture

Process	Unit	KRAFT manufacture (per t)
Wood preparation	kWh	22.2
Kraft Pulping Continuous	kWh	179.5
Kraft Evaporators	kWh	15.7
Kraft Recausticizing	kWh	24.5
Kraft bleaching - softwood	kWh	32.1
Paper Machine – Kraft Papers	kWh	1021.5
Total	kWh	1295.5

Table 40 - Energy consumption of newsprint

Process	Unit	Manufacture (per t)
Wood preparation	kWh	22.2
Mechanical Pulping - TMP for Newsprint	kWh	32
Paper Machine – Newsprint	kWh	565
Total	kWh	619.2

Table 41 - Energy consumption of printing and writing paper.

Process	Unit	Manufacture (per t)
Recycled Pulp	kWh	344
Paper Machine – Printing and Writing	kWh	662.5
Total	kWh	1,006.5

Table 42 - Energy consumption of recycling paper

Process	Unit	Manufacture (t)
Wood preparation	kWh	22.2
Mechanical pulping - TMP for paper	kWh	2,661.6
Paper Machine – Printing and Writing	kWh	662.5
Total	kWh	3,346.3

4.3.3.5 Emission from fertilizer application

As silvicultural practices in both baseline and project scenarios do not considered fertilization, emission from this source is considered zero.

4.3.3.6 Emissions from biomass burning

As silvicultural practices in both the baseline and project scenarios are not considered biomass burning, emission from this source is considered zero.

4.3.3.7 Emissions from forest fires

No emissions from this source have been considered for the ex-ante calculations. Nevertheless, forest fires will be monitored, and any emission related to this type of event will be included in the project monitoring report. The possibility of forest fires emissions is also considered in the non-permanence risk analysis calculation and integrated in the buffer determination.

4.3.3.8 Emissions from harvested wood transport

These emissions are considered in the section 4.3.3.3

4.3.3.9 Emissions from harvested wood processing

Emissions from harvested wood processing has been calculated jointly with the emission from fossil fuel combustion in vehicles and equipment in section above. This has been done as the governmental source used for this calculation does not split the use of energy between on site and off-site vehicles and equipment, and between manufacturing process. Considering that in both cases the general formula considers the amount of fuel / energy used and the emission factor related to this, this has been considered as a nonmaterial adjustment.

4.3.3.10 Emissions from harvested wood products and residuals anaerobic decay

Total CH_4 emissions (accounted as tonnes CO_2e). from wood products in landfills were calculated using the following equation:

$$GHG_{CH4\ PE10/BE10.t} = \sum_{y \le t} RWbiomass_{y.NA} * HWPCH4f_{NA.t-y} + RWbiomass_{y.O} * HWPCH4f_{O.t-y}$$ (Equation 8)[94]

Where:

94 Equation 30 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf.

Parameter	Description	Default Value
$GHG_{CH4PE10/BE10.t}$	Mass of CH_4 emitted by the project or baseline HWPs in landfills up to year t. Expressed in tCO_2e.	N/A
$RWbiomass_{y.NA}$	The dry mass of the delivered roundwood extracted from the project area in year y, used in wood products within North America. Expressed in t.	N/A
$RWbiomass_{y.O}$	The dry mass of the delivered roundwood extracted from the project area in year y, used in wood products offshore. Expressed in t.	N/A
$HWPCH4f_{NA.t-y}$	The factor. derived from Table 73. for CH_4 (accounted as CO_2e) emitted in a given year, equal to the number of years between harvest and time t, for products used in North America. Expressed in tCO_2e / t wood biomass delivered.	Table 14 (Methodology VM0034 of VCS)
$HWPCH4f_{O.t-y}$	The factor, derived from Table 73. for the amount of CH_4 (accounted as CO_2e) emitted in a given year, equal to the number of years between harvest and time t, for products used outside of North America. Expressed in tCO_2e / t wood biomass delivered	Table 14 (Methodology VM0034 of VCS)

The raw biomass is multiplied by the percentage of the wood used in north America (Quebec, United States, rest of Canada) and by the percentage of the wood that is exported Offshore.

Table 43. CH_4 emissions by year, in CO_2e, as a percentage of the total wood biomass delivered, by use area – Derivation detailed in Appendix F[95]

Year	North America	Offshore
0	0.001%	0.001%
1	0.015%	0.000%
2	0.080%	0.100%
3	0.136%	0.096%
4	0.182%	0.092%

95 Derived from Caren C. Dymond, Forest carbon in North America: annual storage and emissions from British Columbia's harvest 1965 - 2065, Carbon Balance and Management 7:8, 2012, Jack K. Winjum, Sandra Brown and Bernhard Schlamadinger, Forest Harvests and Wood Products: Sources and Sinks of Atmospheric Carbon Dioxide, Forest Science 44:2, 1998, and K.E. Skog, Sequestration of carbon in harvested wood products for the United States, Forest Products Journal 58(6):56-72. (2008

5	0.221%	0.118%
6	0.254%	0.140%
7	0.281%	0.159%
8	0.302%	0.175%
9	0.320%	0.189%
10	0.334%	0.200%
11	0.345%	0.210%
12	0.354%	0.218%
13	0.361%	0.225%
14	0.364%	0.230%
15	0.367%	0.234%
16	0.369%	0.237%
17	0.369%	0.239%
18	0.368%	0.240%
19	0.366%	0.240%
20	0.364%	0.240%

4.3.4 Leakage

Following the selected methodology, activity displacement and market need to be assessed as the potential sources of leakage.

Activity shifting leakage defined as the one related to the increase in GHG emissions from areas outside the project area, occurring when the actual agent responsible for baseline land use or land use change moves to or undertakes activities in an area outside of the project area and modify the existent land use to continue with the activities displaced from the project area.

For internal activity shifting leakage:

Forest lands owned or managed by any PIVOT participant, outside the area included in the project will continue to be forest land with or without forest management or harvesting activities. Instance responsible (aggregator) will monitor any land use change over the area under his responsibility and ECOTIERRA will assess the impact at the instance level and account the corresponding activity shifting leakage.

In the case of non-forest lands owned or managed by any PIVOT participant, as only lands classified as “friches” are eligible under PIVOT for ARR activities and considering that these lands are classified as abandoned lands without a productive use, therefore, no displacement of activities will take place.

Following section 8.4.1.1, step 1 of the methodology, the assessment of activity shifting leakage was done for each new instance. The propriety owners throughout the aggregator filled out a consultation questionnaire where they were asked the following questions:

- Question 19 - Do you intend to sell for development or develop (deforestation) certain parts of your properties not affected by the PIVOT project? If so, what nature would this development be and what would be the area deforested?
- Question 20 - Do you intend to increase the timber harvest in other parts of your properties not affected by the PIVOT project to compensate for the possible reduction in timber harvest in the plots targeted by the PIVOT project?

The answers from all owners were negative[9697] [98]

In the case of FHI_2017_ERA_001 and FHI_2017_LtPF_001 a gis analize was also carried out to demonstrate that non- Activity shifting leakage took place[99] see section 5.3

Market leakage is defined in section 3 of the methodology as an increase in GHG emissions from areas outside the project area, which occurs as a result of the project (in the case of PIVOT the instance) **significantly** reducing the production of a commodity, causing a change in the supply and market demand equilibrium, which results in a shift of production elsewhere to make up for the lost supply.

Following this definition and the procedures in section 8.4.1.2 of the methodology, as described in the project design document, the first element to be assessed Is the significance of the impact of the project in the production of timber in the Quebec market. To determine the significance of this impact a benchmark of 5% of the Quebec market volume was established for the project.

Even if it was demonstrated that in all cases the significance of the timber production was not higher than 0,2% and it is clear that no instance is capable of affecting the market demand equilibrium, market leakage in project instances will be assessed and quantified considering their impact against its own baseline and not the market following an official clarification from the VERRA team (see section 5.3).

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[96] See document "Changements_Fuites_ACA_2022" available in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_ERA_002\Leakage assessment

[97] See document "Changements_Fuites_ACA_2022" available in 1. ECOTIERRA\5. External Sharing\INCLUSION CARs\ACA_2021_LTPF_002\Leakage assessment

[98] See "Changements_Fuites_Mont-Brome_2022" Available in: ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\SMB_2022_LTPF_003\Leakage assessment

[99] See document "Changements_Fuites_FHI_2022 »Available in : ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\FHI_2017_ERA_001\Leakage assessment and in ECOTIERRA Dropbox\1. ECOTIERRA\5. External Sharing\INCLUSION CARs\FHI_2017_LtPF_001\Leakage assessment

Following this clarification, PIVOT instances shall to apply in all cases the procedures in section 8.4.1.2 of the methodology, when a project involves changing the amount of harvesting that occurs in the project area relative to the baseline. This situation happens in the two instances under verification owned by Forêt Hereford. In this case, method 3 was selected to define the market leakage discount factor used. In section 5.3 of the document, the justification and evidence of how the leakage discount factor is determined is included.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

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5.1 Baseline Emissions

5.1.1 Calculation of baseline forest carbon content in pools in instances under IFM activities

As mentioned in previous sections, the total potential area of the proposed project has been divided into three strata. The project works with a set of 4 key attributes based on the NFI Design Document[100]

Table 44. PIVOT key attributes for IFM activities based on Canada's national forest inventory.

Key attributes
1. Total forest areas
2. Total forest areas by stratum (Continuous boreal forest, mixed forest and deciduous forest)
3. Age class by sub-stratum (1-20, 21-40, 41-60, 61-80, 81+)
4. Total biomass by pool by sub-stratum and age class (aboveground. belowground and dead wood)

The selection of accounted carbon pools has been done following the requirements of section 5.2.2 of the selected methodology (see Table 14)

Baseline for IFM – ERA and IFM - LtPF activities

To define the project level baseline, PIVOT obtained the field data of NFI parcels located in the project area. This data was provided by the NFI. The data linked each parcel to the bioclimatic domain of the corresponding Quebec ecological classification (link to project strata). Plots identified as no forests, plantations, wetlands, those that had undergone a significant natural disturbance (windthrow, fire, insect, etc.) or those with outlier values were eliminated. In addition to NFI data, the Continuous Boreal

[100] Canada's National Forest Inventory National Standards for Ground Plots Compilation Procedures. Available in: https://nfi.nfis.org/resources/groundplot/GP_compilation_procedures_2.4.pdf

Forest stratum was enriched with data provided by the Laval University to increase the overall soundness of the curve.

Biomass curves were developed for each strata and for above-ground live biomass (standing live trees) and for above-ground dead biomass (standing dead trees and woody debris). Corresponding adjustments were made using R and the final equations are shown in Table 45.

Table 45. Biomass models according to the project strata

Strata	Formula	Model
Above-ground live biomass (t.d.m/ha)		
Continuous boreal forest	*Biomass = 135.653 * (1 - Exp (- 0.061 * AGE))^4.291*	*Chapman-Richards (Richards. 1959[101])*
Mixed Forest	*Biomass = 144.916 * (1 - Exp (- 0.063* AGE))^ 4.291*	
Deciduous forest	*Biomass = 160.754 * (1 - Exp (- 0.065 * AGE))^ 4.291*	
Above-ground dead biomass (t.d.m/ha)		
Continuous boreal forest	*Biomass = Exp (-0.040 * ÂGE) * 44.902 + 0.288 * AGE*	*Non-linear regression (Barrette et al. 2013 (eq.5))[102]*
Mixed Forest	*Biomass = Exp (-0.033 * ÂGE) * 35.254 + 0.183* AGE*	
Deciduous forest	*Biomass = Exp (-0.070 * ÂGE) * 25.497 + 0.125 * AGE*	

Estimation of current biomass quantity for each stratum

For the estimation of the current biomass at the strata level and using the biomass raster maps produced by the NFI, PIVOT established the average current biomass amount for each stratum. Using the non-forest land features of the Quebec ecoforestry map, all the pixels of the biomass matrix that did not represent forest land were discarded. The manipulations of vector and matrix data were carried out using ArcGIS.

Using existing equations from IPCC (2003), biomass data from live trees and wood density were used to estimate commercial volume and an average wood density for broadleaves and conifers were calculated (see Table 22). Matrices made by the NFI were used to determine the proportions of broadleaves and conifers populations for each sub-strata. An average percentage was allocated for

[101] Richards F.J. 1959. A flexible growth for empirical use. J. Exp. Bot. 10: 290-300

[102] Barrette, J., Pothier, D., Ward. C. 2013. Temporal changes in stem decay and dead and sound wood volumes in the northeastern Canadian boreal forest. Can. J. For.Res. 43: 234-244.

each pixel of the matrix. The commercial volume was then calculated based on the corresponding percentage of hardwood and softwood proportion (see Table 46).

The corresponding biomass expansion factor for each strata and sub-strata, necessary to determine the commercial volume was taken from Table 3A.1.10 (Default values of biomass expansion factors - BEFs) of IPCC[103] (see Table 23). For the mixed forest sub-strata an average between conifers and broadleaf was calculated. Commercial volume is used to calculate the carbon stocked in products.

Table 46. Average percentage of composition per stratum

Average percentage of composition per stratum		
Stratum	Conifers	Broadleaf
Continuous boreal forest	70.3	29.7
Mixed Forest	50.5	49.5
Deciduous forest	38.7	61.3

For above-ground biomass, the PIVOT uses the Chapman-Richards model (Richards. 1959)[104] to simulate the growth of the living biomass. The generic model was adjusted for each stratum using corresponding forest data and the R statistical tool. Theses curves were used to determine the amount of biomass available for one average hectare of forest for each sub strata according to the age class of the plot. It is therefore possible to estimate the amount of biomass at the time of harvesting according to the age class defined for each stratum according to the activity to be developed.

For dead biomass. the project uses a model proposed by Barette al, 2013[105] (see Table 45) which forms a pattern similar to that of dead wood after disturbance (boomerang form). Given that this model has an order of origin (unlike that of living biomass from 0), data from Thiffault et al. (2014)[106] of quantities of woody debris after cutting in mixed and deciduous stands in Quebec and Ontario were used as guidance to adjust the curves. The R adjusted curves are shown in Figure 10 and Figure 11.

[104] Richards F.J. 1959. A flexible growth for empirical use. J. Exp. Bot. 10: 290-300

[105] Barrette, J., Pothier, D., Ward. C. 2013. Temporal changes in stem decay and dead and sound wood volumes in the northeastern Canadian boreal forest. Can. J. For.Res. 43: 234-244.

[106] Thiffault, E., Béchard, A., Paré, D. & Allen, D. 2014. Recovery rate of harvest residues for bioenergy in boreal and temperate forests : A reviews. WIREs Energy Environ. Doi: 10.1002/wene.157

Figure 10. Aboveground biomass growth model by project stratum

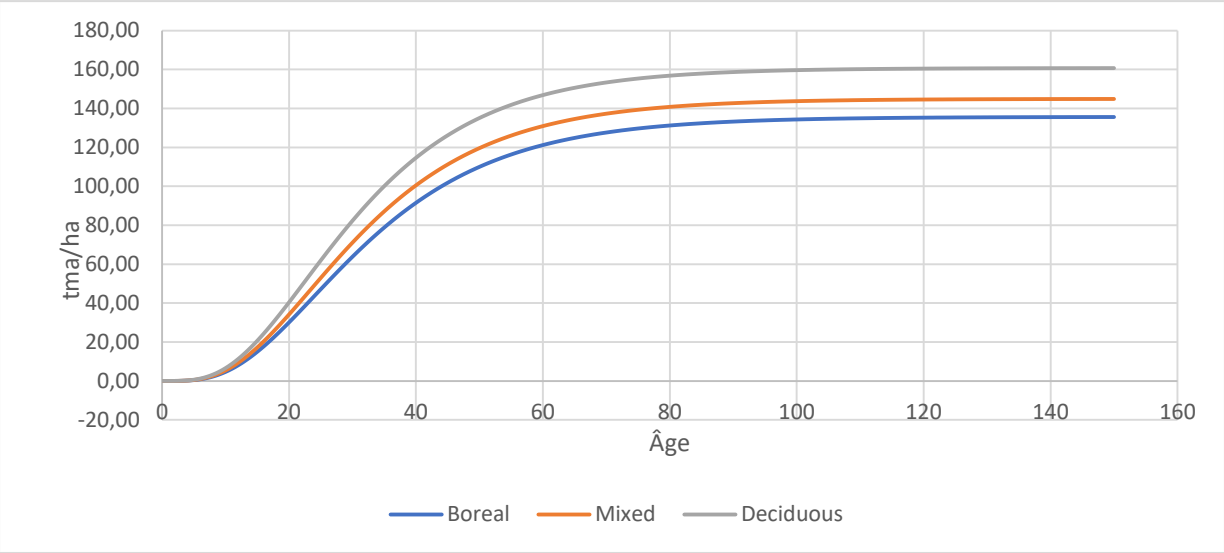
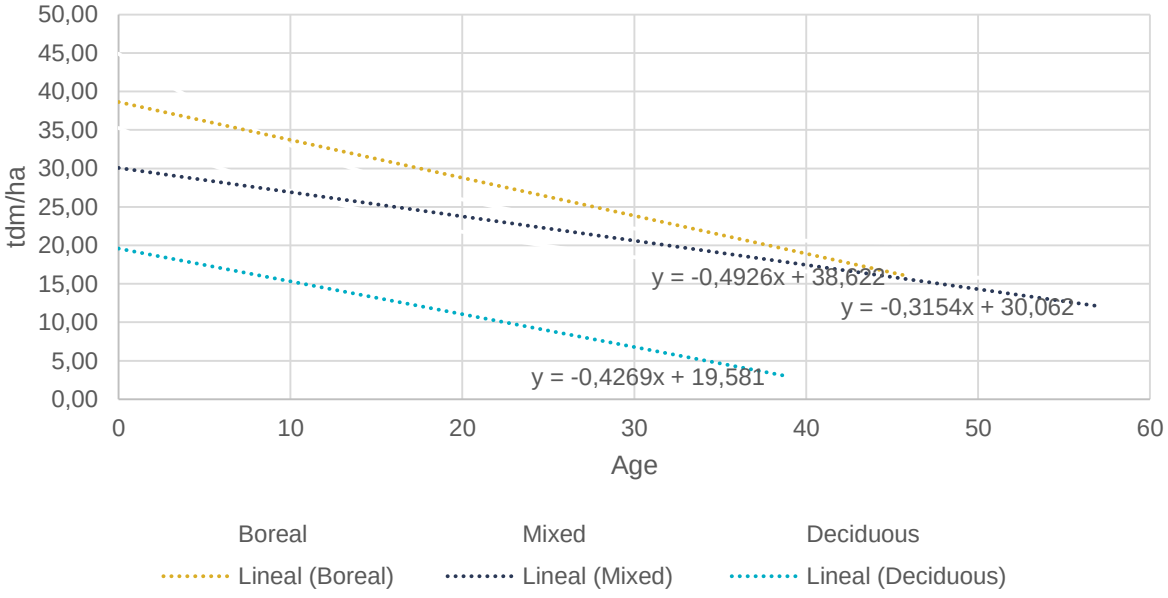


Figure 11. Deadwood biomass growth model by project stratum



Belowground biomass

Belowground biomass is estimated based on a proportion of aerial biomass. PIVOT use default values provided by the IPCC table 4.4 (2006)[107] for calculating this relationship according to the domain, ecological zone, the type of vegetation and the amount of above-ground biomass. As the root-shoot ration usually changes over time, different values are used for this process, depending on the values of aboveground biomass (see Table 21).

Forest management and harvest flow main elements are shown in Table 47 below. These data is relevant for the calculation of the baseline forest carbon pools.

Table 47 – Common practice parameters for baseline calculation

Stratum	*Sub-stratum*	*Precommercial thinning*		*Commercial thinning*		*Selection cut / Irregular shelterwood system*		*Harvesting*	
		Year	*Intensity*	*Year*	*Intensity*	*Year*	*Intensity*	*Year*	*Intensity*
Continuous Boreal Forest	Coniferous							*50*	*100%*
	Broadleaf			*50*	*50%*			*70*	*100%*
Mixed Forest	Coniferous					*50. 65. 80. 95*	*35%*		
	Broadleaf	*30*	*30%*			*50. 65. 80. 95*	*30%*		
Deciduous Forest	Coniferous					*50. 65. 80. 95*	*35%*		
	Broadleaf	*30*	*30%*			*50. 65. 80. 95*	*30%*		

5.1.2 Baseline adjustment of GHG emissions of FHI_2017_ERA_001 and FHI_2017_LtPF_001 instances

To adjust the general baseline biomass curves. a forest inventory was carried out in each of the instances. This process was done in instances FHI_2017_ERA_001 and FHI_2017_LtPF_00 owned by Forêt Herford between November 11th and December 20th, 2017 and the collected field data was processed to be used by Artemis 2014 (see SOP baseline adjustment). Artemis generate a series of growth curves of commercial volume for each population substrata at the instance level (conifers, mixed, broadleaf) (See SOP Artemis users guide). The curves were converted to biomass curves using the wood density defined for the corresponding substrata and the expansion factor (see Table 50)

[107] Table 4.4. of the Forest land chapter (IPCC, 2006)

adjusting the Champs and Richards above-ground live biomass (t.d.m/ha) model (used in the ex-ante calculation) of the deciduous forest strata to Artemis data in R-Project by substrata at instance level.

This process generated three (3) above-ground live biomass models and their respective commercial volume growth curves to adjust volume curves (conifers, mixed, broadleaf) were the silvicultural treatment scheme was applied considering each substratum and consolidating them at the instance level.

Biomass growth models generated for PIVOT were then applied to the corresponding instance considering stratum and age-class classification, as well as common practice operations.

Calculation of GHG emissions in the baseline implied integrating data for each sub-stratum in one calculation according to these percentages. The standing commercial volume was adjusted according to the silvicultural treatments in each stratum and the harvested volume in each treatment. To have a conservative value of biomass stock, a percentage of biomass loss after harvesting is considered.

As mentioned before, FH's instances were adjusted according to the updates of the cadastre in the province of Quebec. The adjustment of the areas and their percentages (forest composition) is presented in Table 48 and Table 49.

Table 48. Adjusted parameters related to updated areas in baseline calculations for instance FHI_2017_ERA_001

Parameters		2018	2022
Instance area (ha)		142.2	133.6
Forest composition (%)	Conifers	1%	1%
	Mixed	35%	35%
	Broadleaf	64%	64%
Forest class age	1-20	15%	15%
	21-40	12%	12%
	41-60	73%	73%
	61-80	0.00%	0.00%
	>80	0.00%	0.00%

Table 49. Adjusted parameters related to updated areas in baseline calculations for instance FHI_2017_LtPF_001

Parameters		2018	2022
Instance area (ha)		685.8	664.9
Forest composition (%)	Conifers	3%	3%
	Mixed	49%	49%
	Broadleaf	48%	48%
Forest class age	1-20	5.5%	5.5%

	21-40	3.2%	3.2%
	41-60	87.8%	87.8%
	61-80	0.9%	0.9%
	>80	2.6%	2.6%

It is important to highlight that only the areas of the instances were updated from the 2018 baseline adjustment. The rest of the parameters and emission factors remained the same.

5.1.3 Baseline Live and Dead Forest Carbon Pools (Excluding Harvested Wood) (BP1 – BP5)

The following carbon pools for both the project and baseline scenarios were considered:

- PP1/BP1 Above-ground tree biomass (Standing Live Trees)
- PP2/BP2 Above-ground non-tree biomass (Shrubs and Herbaceous Understory)
- PP3/BP3 Below-ground biomass (Live Roots)
- PP4/BP4 Dead wood (Standing Dead Trees)
- PP5/BP5 Dead wood (Lying Dead Wood)

The results of the procedure explained in section 5.1.1 for the transformation of standing commercial volume to biomass in all pools are presented in Table 50, showing the growing carbon stocks for live and dead biomass forest carbon pools per hectare in FHI instances according to the forest composition.

Table 50. Growing carbon stocks ($tCO_2e\ ha^{-1}$) for live and dead biomass forest carbon pool in FHI instances

Forest age	Weighted Average Standing commercial. Volume ($m3\ ha^{-1}$)				Weighted Average Aboveground ($tms\ ha^{-1}$)	Belowground ($tms\ ha^{-1}$)	Deadwood ($tms\ ha^{-1}$)	Total ($tms\ ha^{-1}$)	$tCO_2e\ ha^{-1}$
	Conifers	Mixed	Broadleaf	Total					
1	0.0	0.0	0.1	0.2	0.1	0.1	23.9	24.1	44.1
2	0.0	0.3	0.7	1.1	0.7	0.3	22.4	23.4	42.8
3	0.1	1.0	1.9	3.0	1.9	0.8	21.0	23.7	43.5
4	0.1	2.2	3.7	6.0	3.9	1.6	19.8	25.2	46.2
5	0.2	3.9	6.1	10.1	6.6	2.6	18.6	27.8	50.9
6	0.3	6.0	9.0	15.3	9.9	4.0	17.5	31.4	57.5
7	0.3	8.7	12.4	21.4	13.9	5.6	16.5	35.9	65.8
8	0.4	11.6	16.2	28.3	18.3	7.3	15.5	41.2	75.5
9	0.5	14.9	20.4	35.8	23.2	9.3	14.7	47.1	86.3
10	0.6	18.4	24.8	43.7	28.3	11.3	13.9	53.5	98.1
11	0.7	22.0	29.4	52.0	33.7	13.5	13.1	60.3	110.6

Forest age	Weighted Average Standing commercial. Volume (m3 ha^{-1})				Weighted Average Aboveground (tms ha^{-1})	Belowground (tms ha^{-1})	Deadwood (tms ha^{-1})	Total (tms ha^{-1})	tCO_2e ha^{-1}
12	0.7	25.7	34.1	60.6	39.2	15.7	12.5	67.4	123.5
13	0.8	29.4	39.0	69.2	44.8	17.9	11.8	74.6	136.7
14	0.9	33.1	43.9	77.8	50.4	14.6	11.3	76.3	139.9
15	1.0	36.7	48.8	86.4	56.0	16.2	10.8	82.9	152.1
16	1.1	40.2	53.6	94.9	61.4	17.8	10.3	89.5	164.1
17	1.1	43.6	58.4	103.1	66.8	19.4	9.8	96.0	176.0
18	1.2	46.8	63.1	111.2	72.0	20.9	9.4	102.3	187.6
19	1.3	49.9	67.7	118.9	77.0	22.3	9.1	108.4	198.8
20	1.3	52.9	72.2	126.4	81.9	23.7	8.7	114.4	209.7
21	1.4	55.6	76.6	133.6	86.5	25.1	8.4	120.1	220.1
22	1.5	58.2	80.8	140.5	91.0	26.4	8.2	125.6	230.2
23	1.5	60.7	84.8	147.0	95.3	27.6	7.9	130.8	239.8
24	1.6	63.0	88.7	153.3	99.3	28.8	7.7	135.8	249.0
25	1.7	65.1	92.5	159.2	103.1	29.9	7.5	140.6	257.7
26	1.7	67.1	96.0	164.8	106.8	31.0	7.3	145.1	266.0
27	1.8	68.9	99.5	170.1	110.2	32.0	7.2	149.4	273.8
28	1.8	70.6	102.7	175.1	113.5	32.9	7.1	153.4	281.3
29	1.9	72.1	105.8	179.8	116.5	33.8	6.9	157.2	288.3
30	1.9	73.6	108.8	184.2	119.4	34.6	6.8	160.9	294.9
31	1.9	52.4	78.1	132.5	85.8	24.9	6.8	117.5	215.4
32	2.0	53.3	79.9	135.2	87.6	25.4	6.7	119.7	219.5
33	2.0	54.1	81.7	137.8	89.3	25.9	6.6	121.8	223.3
34	2.1	54.8	83.4	140.2	90.9	26.4	6.6	123.8	227.0
35	2.1	55.5	84.9	142.5	92.4	26.8	6.5	125.7	230.4
36	2.1	56.1	86.4	144.6	93.7	27.2	6.5	127.4	233.6
37	2.2	56.6	87.8	146.6	95.0	27.6	6.5	129.1	236.7
38	2.2	57.2	89.1	148.5	96.2	27.9	6.5	130.6	239.5
39	2.2	57.6	90.4	150.2	97.4	28.2	6.5	132.1	242.2
40	2.2	58.1	91.5	151.8	98.4	28.5	6.5	133.5	244.7
41	2.3	58.4	92.6	153.3	99.4	28.8	6.5	134.8	247.1
42	2.3	58.8	93.7	154.7	100.3	29.1	6.6	136.0	249.3
43	2.3	59.1	94.6	156.1	101.2	29.4	6.6	137.1	251.4
44	2.3	59.4	95.6	157.3	102.0	29.6	6.6	138.2	253.4
45	2.4	59.7	96.4	158.5	102.8	29.8	6.7	139.2	255.3
46	2.4	59.9	97.2	159.5	103.4	30.0	6.7	140.2	257.0

Forest age	Weighted Average Standing commercial. Volume (m3 ha^{-1})				Weighted Average Aboveground (tms ha^{-1})	Belowground (tms ha^{-1})	Deadwood (tms ha^{-1})	Total (tms ha^{-1})	tCO$_2$e ha^{-1}
47	2.4	60.2	98.0	160.5	104.1	30.2	6.8	141.1	258.6
48	2.4	60.4	98.7	161.5	104.7	30.4	6.9	141.9	260.2
49	2.4	60.6	99.4	162.3	105.3	30.5	6.9	142.7	261.7
50	1.6	42.5	70.0	114.1	74.0	21.5	6.7	102.2	187.3
51	1.6	42.6	70.4	114.6	74.3	21.6	6.3	102.2	187.4
52	1.6	42.7	70.8	115.1	74.7	21.7	6.0	102.3	187.5
53	1.6	42.8	71.1	115.6	75.0	21.7	5.6	102.3	187.5
54	1.6	42.9	71.5	116.0	75.2	21.8	5.3	102.3	187.6
55	1.6	43.0	71.8	116.4	75.5	21.9	5.2	102.6	188.0
56	1.6	43.0	72.1	116.7	75.7	22.0	5.2	102.9	188.7
57	1.6	43.1	72.4	117.1	76.0	22.0	5.3	103.3	189.4
58	1.6	43.2	72.6	117.4	76.2	22.1	5.4	103.6	190.0
59	1.7	43.2	72.9	117.7	76.4	22.1	5.4	103.9	190.5
60	1.7	43.3	73.1	118.0	76.5	22.2	5.5	104.2	191.1
61	1.7	43.3	73.3	118.3	76.7	22.3	5.6	104.5	191.6
62	1.7	43.3	73.5	118.5	76.9	22.3	5.6	104.8	192.1
63	1.7	43.4	73.7	118.7	77.0	22.3	5.7	105.1	192.6
64	1.7	43.4	73.9	118.9	77.2	22.4	5.8	105.3	193.1
65	1.1	30.4	51.8	83.3	54.1	15.7	5.5	75.2	137.9
66	1.1	30.4	51.9	83.4	54.1	15.7	5.1	74.9	137.4
67	1.1	30.4	52.0	83.6	54.2	15.7	4.7	74.7	136.9
68	1.1	30.5	52.1	83.7	54.3	15.7	4.4	74.4	136.4
69	1.1	30.5	52.2	83.8	54.4	15.8	4.3	74.4	136.4
70	1.1	30.5	52.3	83.9	54.4	15.8	4.4	74.6	136.7
71	1.1	30.5	52.4	83.9	54.5	15.8	4.4	74.7	136.9
72	1.1	30.5	52.4	84.0	54.5	15.8	4.5	74.8	137.1
73	1.1	30.5	52.5	84.1	54.6	15.8	4.5	74.9	137.4
74	1.1	30.5	52.6	84.2	54.6	15.8	4.6	75.0	137.6
75	1.1	30.5	52.6	84.2	54.7	15.9	4.6	75.2	137.8
76	1.1	30.5	52.7	84.3	54.7	15.9	4.7	75.3	138.0
77	1.1	30.5	52.7	84.4	54.7	15.9	4.8	75.4	138.2
78	1.1	30.5	52.8	84.4	54.8	15.9	4.8	75.5	138.4
79	1.1	30.6	52.8	84.5	54.8	15.9	4.9	75.6	138.5
80	0.7	30.3	37.0	68.0	44.0	17.6	4.8	66.4	121.8

The Table 50 allows the calculation of the carbon stocks of each instance in the baseline considering the following factors: the proportion of % forest sub-strata and composition (the % of forest in each age

class) and the harvesting management plan in the baseline in the monitoring period. The result of the combination of all these factors is presented in Table 51.

Table 51. Accumulated carbon stock (tCO_2e) in FHI_2017_ERA_001. FHI_2017_LtPF_001 and in the whole project

Project year	tCO_2e		
	FHI_2017_ERA_001	FHI_2017_LtPF_001	Total PIVOT
1 January 2018 - December 31 2018	24,931	124,211	149,142
1 January 2019 - December 31 2019	23,929	123,022	146,951
1 January 2020 - December 31 2020	24,262	123,614	147,876
1 January 2021 - December 31 2021	24,592	124,184	148,776
1 January 2022 - December 31 2022	24,718	124,369	149,087

5.1.3.1 Baseline - Harvested Wood Products (In use and in landfill) of FHI_2017_ERA_001 and FHI_2017_LtPF_001 (BP8 and BP9)

Using data of commercial timber volume generated by the project financial tool (see SOP Baseline adjustment), the annual commercial volume is established considering the percentages of age-classes. the population composition of each stratum and the forest management plan in the baseline case. The latter defines the amount of wood to be harvested according to the age class. Therefore, the total volume of wood harvested is a weighted sum according to both factors. The PIVOT calculation tool in the sheet “baseline data” between Cells “CC12” and “CR12” for ERA activity, and between cells “CC246” and “CR246” for LtPF activity present the result of each calculation.

Following the procedures of section 8.1.1.2 of the selected methodology, the total amount of CO_2e in delivered roundwood from the project area is calculated using the following equation.

The VM0034 methodology used separate data sets to estimate retention of HWP carbon pools for HWPs in North America, and in the rest of the world. Therefore, the (1) Default approach proposed by the methodology was selected. Using this approach, in-use and in-landfill storage is based on standard product mixes for North American and offshore markets. This approach allows us to calculate HWP Pools and related methane emissions using standard tables (Table 9 of the VM0034 methodology).

$$G\_HWPCO2_{y.d} = RWbiomass_{y.d} \times CF_{RW} \times \left(\frac{44}{12}\right)$$ (Equation 9)[108]

Where:

Parameters	Description	Value
$G\_HWPCO_{2\,y.d}$	The mass of CO_2e in delivered roundwood extracted from the project area in year y, for each destination d (North America or Offshore), expressed in tCO_2e	See **Table 56** below in this document
$RWbiomass_{y.d}$	The dry mass of the delivered roundwood extracted from the project area in year y. for each destination d (North America or Offshore), expressed in t.	See **Table 52** and **Table 53** and below in this document. This table presents the delivered roundwood extracted from the project area in year y, for each destination d (North America or Offshore). Table 54 below in this document. present the percentage of the wood used in north America (Quebec, United States and the rest of Canada) and by the percentage of the wood that is exported offshore
CF_{RW}	Carbon fraction of wood biomass, using a default value of 0.5.	

[108] Equation 3 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

(44/12)	Molecular weight ration between C and CO_2. using a default value of 44/12

Table 52. Delivered roundwood extracted from the project are expressed in m^3 (instance: FHI_2017_LtPF_001) in year y, for each destination d (North America or Offshore) in the baseline case. expressed in tCO_2.

Year	Baseline Commercial Volume (m^3)	North America	Offshore
		Rwbiomass (tCO_2)	Rwbiomass (tCO_2)
1 January 2018 -December 31 2018	41.6	35.3	0.5
1 January 2019 -December 31 2019	0.0	0.0	0.0
1 January 2020 -December 31 2020	0.0	0.0	0.0
1 January 2021 -December 31 2021	0.0	0.0	0.0
1 January 2022 - December 31 2022	0.0	0.0	0.0

Source: Sheet "BP HWP" Cells S275 and V275 in Pivot calculation tool

Table 53. Delivered roundwood extracted from the project are expressed in m3 (instance: FHI_2017_ERA_001) in year y, for each destination d (North America or Offshore) in the baseline case. expressed in tCO_2t.

Year	Baseline Commercial Volume (m^3)	North America	Offshore
		Rwbiomass (tCO_2)	Rwbiomass (tCO_2)
1 January 2018 -December 31 2018	32.9	28.0	0.4
1 January 2019 -December 31 2019	0.0	0.0	0.0
1 January 2020 -December 31 2020	0.0	0.0	0.0
1 January 2021 -December 31 2021	0.0	0.0	0.0
1 January 2022 - December 31 2022	0.0	0.0	0.0

Source: Sheet "BP HWP" Cells S8 and V8 in Pivot calculation tool

The raw biomass is then multiplied by the percentage of the wood used in north America (Quebec. United States and the rest of Canada) and by the percentage of the wood that is exported offshore.

Table 54. Percentage of the wood used in north America (Quebec. United States and the rest of Canada) and percentage of the wood that is exported offshore.

	North america			Offshore
	Québec	United States	Rest of Canada	Other
Québec	58.40%	15.80%	24.40%	1.40%
		98.60%		1.40%

Source: Government of Quebec (2016).[109]. See sheet data tables. cell B4 and BF. of the Pivot calculation tool.

The total of dry biomass delivered as round wood by product destination will be obtained using the following equation.

$$\mathrm{RWbiomass}_{y.d} = \sum_s (\mathrm{Vol}_{s.y.d} \times \mathrm{wd}_s) \text{ (Equation 10)}^{110}$$

Where:

Parameter	Description	Value
$\mathrm{RWbiomass}_{y.d}$	The dry mass of the delivered roundwood extracted from the project area in year y, for each destination d (North America or Offshore), expressed in t.	See Table 52 and Table 53 above in this document
$\mathrm{Vol}_{s.y.d}$	The volume of delivered roundwood of species o group of species s for each wood product destination d, extracted from the project area in year y, expressed in m^3.	See Table 52 and Table 53 above in this document
wd_s	The wood density factor for species or group of species s, expressed in t/m^3.	See Table 22

As it was mentioned above, wood density for each group of species (related to population type) was calculated to obtain a mean value for conifers and broadleaf populations (see Table 46 and Table 22). Matrices made by the NFI also give the proportions of hardwoods and softwoods for each subarea. An average percentage is allocated for each pixel of 250 m^2 of the matrix.

[110] Equation 2 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Given the linkage between carbon stored in the in-use and landfill pools, both pools will be quantified as part of a single overall approach, using the default approach detailed in section 8.1.1.2 of the methodology.

The total GHG remaining in HWPs in use and in landfills, at a given time t, is calculated using the following equation:

$$GHG_{CO2.HWP.t} = \sum_{y \le t}(G\_HWPCO2_{y.NA} \times HWPf_{NA.t-y} + G_{HWPCO2_{y.O}} \times HWPf_{O.t-y}) \text{ (Equation 11)}^{111}$$

Where:

Parameter	Description	Value
$GHG_{CO2.\ HWP.\ t}$	Mass of carbon dioxide stored in project or baseline HWPs up to time *t*. Expressed in tCO_2e	See Table 56 and Table 57 below in the document
$G\_HWPCO2_{y.NA}$	The mass of CO_2 in delivered roundwood extracted from the project area in year *y*, destined for use in North America. Expressed in tCO_2e (See Equation 3 of Methodology VM0034 -VCS)	See Table 56 nd Table 57 below in the document
$G\_HWPCO2_{y.O}$	The mass of CO_2 in delivered roundwood extracted from the project area in year *y*, destined for use outside of North America. Expressed in tCO_2e (See Equation 3 of Methodology VM0034 -VCS)	See Table 56 and Table 57 below in the document
$HWPf_{NA.t-y}$	The factor derived from table 9 (Methodology VM0034 -VCS). for the percentage of CO_2 remaining stocked in HWP (in-use and landfill) after the number of years between harvest and time *t*, for products used in North America[112].	Default values Table 9 of the methodology VM0034 (see Table 55 below in the document)
$HWPf_{O.t-y}$	The factor derived from tables 9 (Methodology VM0034 -VCS), for the percentage of CO_2 remaining stocked in HWP (in-use and landfill) after the number of years between harvest and time *t*, for products used outside of North America.	Default values from Table 9 of the methodology VM0034 (see

[111] Equation 4 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

		Table 55 below in the document)
$y \leq t$	Any year y up to year t	N/A

Table 55 - Fraction of CO_2 remaining in-use and in landfill per year. by product category and destination

Year	Products used in North America - % of total delivered C stored after y years	Products used offshore - % of total delivered C stored after y years
0	65.2%	76.0%
1	63.3%	72.7%
2	60.9%	72.4%
3	58.8%	72.1%
4	56.9%	71.0%
5	55.2%	69.8%
6	53.7%	68.6%
7	52.3%	67.4%
8	51.0%	66.2%
9	49.9%	65.1%
10	48.9%	63.9%
11	47.9%	62.8%
12	47.0%	61.6%
13	46.2%	60.5%
14	45.4%	59.4%
15	44.7%	58.3%
16	44.1%	57.3%
17	43.5%	56.2%
18	42.9%	55.2%
19	42.3%	54.2%
20	41.8%	53.2%
25	39.5%	48.4%
30	37.7%	44.0%
35	36.1%	40.1%
40	34.7%	36.5%
45	33.5%	33.2%
50	32.4%	30.2%
55	31.4%	27.5%

Year	Products used in North America - % of total delivered C stored after y years	Products used offshore - % of total delivered C stored after y years
60	30.5%	25.1%
65	29.7%	22.9%
70	28.9%	20.8%
75	28.2%	19.0%
80	27.6%	17.3%
85	27.0%	15.8%
90	26.5%	14.4%
95	26.0%	13.1%
100	25.6%	12.0%

Table 56. Baseline Pools Harvested Wood Products (In use and in landfill) per hectare in FHI_2017_ERA_001

Project year	Products used in North America - G_HWPCO2y.NA (tCO2e/ha)	Products used offshore - G_HWPCO2y.O (tCO2e)	$GHG_{CO2.\ HWP.\ t}$ (tCO_2e/ha)
1 January 2018 -December 31 2018	18.3	0.3	18.55
1 January 2019 -December 31 2019	17.7	0.3	17.46
1 January 2020 -December 31 2020	17.1	0.3	16.67
1 January 2021 -December 31 2021	16.5	0.3	16.15
1 January 2022 - December 31 2022	15.9	0.3	15.67

Table 57. Baseline Pools Harvested Wood Products (In use and in landfill) per hectare in FHI_2017_LtPF_001

Project year	Products used in North America - G_HWPCO2y.NA (tCO2e/ha)	Products used offshore - G_HWPCO2y.O (tCO2e)	$GHG_{CO2.\ HWP.\ t}$ (tCO_2e/ha)
1 January 2018 -December 31 2018	23.0	0.4	23.42
1 January 2019 -December 31 2019	22.4	0.4	22.03
1 January 2020 -December 31 2020	21.5	0.4	21.04
1 January 2021 -December 31 2021	20.8	0.4	20.38
1 January 2022 - December 31 2022	20.1	0.4	19.78

The following tables present the total Mass of carbon dioxide stored in baseline HWPs (tCO_2e) in FHI_2017_ERA_001 and FHI_2017_LtPF_001 instances.

Table 58. Baseline Pools Harvested Wood Products (In use and in landfill) in FHI_2017_ERA_001. FHI_2017_LtPF_001 and Pivot project

Project year	HWP stock GHGCO2. HWP. t (tCO2e)	HWP stock GHGCO2. HWP. t (tCO2e)	Total Pivot
1 January 2018 -December 31 2018	2,478	15,572	18,051
1 January 2019 -December 31 2019	2,332	14,652	16,984
1 January 2020 -December 31 2020	2,227	13,993	16,220
1 January 2021 -December 31 2021	2,157	13,553	15,710
1 January 2022 - December 31 2022	2,094	15,572	17,666

5.1.4 Calculation of baseline emissions from sources in FHI_2017_ERA_001 and FHI_2017_LtPF_001

The calculation method used to estimate emissions in each of the sources is described below.

5.1.5 Emissions from fossil fuel production (BE1)

The emissions factors used in section 5.1.7, 5.1.9, 5.1.11.2 and 5.1.2.8 were determined from – cradle-to-grave activities as allowed by the methodology. Emissions related to fossil fuel production are considered therefore in those sections.

5.1.6 Baseline emissions from fertilizer production (BE2)

Silvicultural practices in the baseline scenario do not considered fertilization. Therefore, no emission from this source were considered.

5.1.7 Baseline emissions from transport of material. equipment. inputs. and personnel to site and emissions from harvested wood transport[113] to site (BE3/BE8)

Emissions from transportation of materials, equipment, inputs, and personnel to the instance site in the baseline as well as transportation of harvested wood to primary transformation facilities were calculated using the following equation:

$$GHG_{j.PE3/BE3.t} = \sum_m (EF_{m.j} \times AL_{m.t} \times CF_m)$$ (Equation 12)[114]

Where:

Parameter	Description	Value
$GHG_{j.PE3/BE3.t}$	Emissions of GHG *j*, from transportation of materials, equipment, inputs and personnel in the baseline during reporting period *t*. Expressed in t.	See Table 64
$EF_{m.j}$	Emission factor (EF) for transportation mode *m* and GHG *j*. Expressed in t/unit of transported material using transportation mode *m*.	See Table 59
$AL_{m.t}$	The quantity of materials, equipment, inputs, and personnel transported by mode *m* during reporting period *t*. Expressed in units of transported material: persons, items or tonnes, as appropriate.	Table 61. Table 62 and Table 63
CF_m	The conversion factor to be used if the units of the activity level do not match those of the emission factor for transport mode *m*. Where both the activity level and emission factor are expressed in the same units. CF would be set to 1. Dimensionless.	0.5
J	The relevant GHGs in this methodology: CO_2. CH_4 and N_2O	N/A
T	The reporting period in question, where the value of *t* indicates the number of reporting periods that have occurred since the start of the project up to the reporting period in question.	N/A
M	Transportation mode	N/A

[114] Equation 12 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Table 59. Emission factors[115]

Energy Source	Unit	MJ/Unit	KWH/Unit	Btu Unit	Emissions (g/unit)			
					CO_2	CH_4	N_2O	CO_2e
Other	GJ	1000	277.78	948 055.52				
Biochar	Kg	27.6	7.67	26 166.25	3 190.00	0.567	0.077	3 222.97
Biodiesel	L	35.67	9.91	33 817.14	2497	0	0	2 497.00
Biogas (metane portion)	m3	38.32	10.64	36 361.42	1878	0.037	0.034	1 889.32
Biomethanol (100%)	L	23.41	6.5	22 193.98	1519	0	0	1 519.00
Bitumen	L	44.46	12.35	42 150.55	1778	0	0	1 778.40
Butane	L	28.44	7.9	26 962.70	1730	0.024	0.108	1 763.98
Jet Fuel	L	37.4	10.39	35 457.28	2 534.00	0.08	0.23	2 606.98
Foreign bituminous coal	Kg	29.82	8.28	28 271.02	2340	0.03	0.02	2 346.83
Charcoal	Kg	27.6	7.67	26 166.25	3 190.00	0.576	0.077	3 231.97
Coal Coke	Kg	28.83	8.01	27 332.44	2480	0.03	0.02	2 486.83
Petroleum Coke (upgrade)	L	40.57	11.27	38 462.61	3 494.00	0.12	0.023	3 503.68
Petroleum Coke (refine)	Kg	46.35	12.88	43 942.38	3826	0.12	0.027	3 836.74
CRD	Kg	16.72	4.64	15 851.49	715.00	0	0	714.95
Wood waste (wood residues) dry base	Kg	19.2	5.33	18 202.67	1 799.00	0.576	0.077	1 834.97
Diesel	L	38.3	10.64	36 310.53	2 663.00	0.133	0.4	2 789.79
Bark	Kg	20	5.56	18 960.96	1 799.00	0.576	0.077	1 834.97
Electricity	kWh	3.6	1	3 413.00	2.00	0	0	2 040.00
Gasoline (cars)	L	34.87	9.69	33 058.70	2 289.00	2.7	0.05	2 362.20
Gasoline (aviation)	L	33.52	9.31	31 778.82	2 342.00	2.2	0.23	2 459.50

[115] Source: Emission factors used were published by the Quebec Government. Office of Energy Efficiency and Innovatio. Bureau de l'efficacité et de l'innovation énergétiques (2017). Biomasse forestière résiduelle. Publications et formulaires. Facteurs d'émissions. Available in: https://transitionenergetique.gouv.qc.ca/fileadmin/medias/pdf/FacteursEmission.pdf

Energy Source	Unit	MJ/Unit	KWH/Unit	Btu Unit	Emissions (g/unit)			
					CO_2	CH_4	N_2O	CO_2e
Ethane	L	17.22	4.78	16 325.52	976.00			976.00
Ethanol (100%)	l	23.41	6.5	22 193.98	1 519.00	0	0	1 519.00
Cokerine gas	L	19.14	5.32	18 145.78	879.00	0.037	0.035	1 889.32
Distillation gas (upgrade)	m3	43.24	12.01	40 993.92	2 140.00	0	0.022	21 496.88
Distillation gas (refinery)	L	36.08	10.02	34 205.84	1 750.00	0	0.022	1 756.88
Landfill gas (methane portion)	m3	38.32	10.64	36 361.42	1 979.00	0.037	0.034	2 177.08
Natural gas	m3	37.89	10.53	35 921.94	1 878.00	0.037	0.034	1 889.32
Animal fat (melted)	L	34.84	9.68	33 030.26	2 348.00	0	0	2 348.00
Vegetable oiio	L	33.44	9.29	31 702.98	2 585.00	0	0	2 585.00
Kerosene	L	37.68	10.47	35 722.73	2 534.00	0.006	0.031	2 543.74
Lignite	kg	15	4.17	14 220.83	1 480.00	0.03	0.02	1 486.83
Used cooking liquor dry basis	Kg	14.2	3.94	13 462.39	1 304.00	0.041	0.027	1 313.23
Lubricants (used oil)	L	39.16	10.88	37 125.86	2 400.00	0.12	0.064	2 422.36
Residual materials collected by a municilpality	kg	11.57	3.21	10 969.00	990.00	0.347	0.047	1 012.03
Light fuel oil no 1	L	38.78	10.77	36 500.14	2 725.00	0.006	0.031	2 652.74
Light fuel oil no 2	L	38.5	10.69	39 500.14	2 725.00	0.006	0.031	2 734.74
Heavy fuel oil (no 5 et 6)	L	42.4	11.81	40 292.36	3 124.00	0.12	0.064	3 146.36
Tires	kg	31.18	8.66	29 560.37	2 650.00	0	0	2 650.00
Propane	L	25.31	7.03	23 995.29	1 510.00	0.024	0.108	1 543.98
Agricultural by-products (not for consumption)	Kg	9.59	2.66	9 091.85	1 074.00	0	0	1 074.00
Biomass by-products (animal and plant residues. excluding wood residues and cooking liquor)	kg	30.03	8.42	28 726.08	3 000.00	0	0	1 074.00
Steam	Lbs	1.05	0.29	1 000.00				

To define the quantity of fuel used by the activity, data published by Canadian Natural Resources ministry in a document named "Status of energy use in Canadian wood products sector[116]" was used[117]. As this report documents the cradle-to-gate energy use in the production of the five commodities (lumber, plywood, oriented stand board manufacture. composite panel board and MDF) and the methodology considers four commodities the following equivalence was used for the proposed project.

Table 60 - Equivalence between VM0034 methodology and Government of Canada' commodities classification.

Methodology	Government of Canada
Lumber mills	Lumber
Plywood mills	Plywood
Chip mills[118]	
Panel mills	Oriented stand board manufacture
	Composite panel board manufacture
	MDF manufacture

Table 61 - Lumber and chip mills' energy use in resource extraction. forest management and resource transportation of lumber mills and chipmills

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	6.98
Liquid propane gas (LPG)	L	0.001
Electricity	kWh	0.073

116 Natural Resources Canada. (2010). Status of Energy Use in the Canadian Wood Products Sector. Table 3-2 Gross cradle-to-gate energy use – softwood lumber manufacture. Available in: Folder Annex\Sources

117 GHG emissions related to transport of material, equipment, inputs and Personnel to Site and Harvested Wood Transport, are reported under the resource extraction, forest management and resource transportation categories.

118 Document "status of energy use in Canadian wood products sector" presents chip mills as an output within the plywood and lumber production process.

Diesel fuel (hauling)*	L	7.64

Table 62 - Ply mills' energy use in resource extraction. forest management and resource transportation

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	3.69
LPG	L	0.002
Electricity	kWh.	0.049
Diesel fuel (hauling)	L	5.59

Table 63 - Panel mills' energy use in resource extraction. forest management and resource transportation

Fuel type in physical units	Unit	Resource harvest and transport (per m^3)
Diesel fuel (harvesting)	L	1.3
LPG	L	0.0
Electricity	kWh	0.0
Diesel fuel (hauling)	L	9.7

Table 64. BE3 and B4 Emisions per hectare

Project year	8.1.2.4 Emissions from Transport of Material. Equipment. Inputs. and Personnel to Site (BE3) 8.1.2.5 Emissions from Fossil Fuel Combustion – Vehicles and Equipment (BE4) (tCO2e/ha)			
	Lumber	Softwood Plywood	Panel mills	Pulp and Paper
1 January 2018 - December 31 2018	1.35	0.00	0.07	1.35
1 January 2019 - December 31 2019	-	-	-	-
1 January 2020 - December 31 2020	-	-	-	-
1 January 2021 - December 31 2021	-	-	-	-
1 January 2022 - December 31 2022				

5.1.8 Baseline Emissions from fossil fuel combustion in vehicles and equipment (BE4)

Emissions from primary processing of harvested wood are to be calculated using the following equation.

$$GHG_{j.PE4/BE4.t} = \sum_f \left[\sum_e \left(EF_{f.e.j} \times AL_{f.e.t} \times CF_{f.e} \right) \right]$$ (Equation 13)[119]

Where:

Parameter	Description	Value
$GHG_{j.PE4/BE4.t}$	Emissions of GHG *j*, from on-site vehicles and equipment fossil fuel combustion during reporting period *t*. Expressed in t GHG *j*.	See Table 64
$EF_{f.e.j}$	The emission factor for GHG *j*, fuel type *f* and equipment/vehicle type *e* (eg. tonnes CO_2 per L diesel]. Expressed in t/unit of fuel.	See Table 59
$AL_{f.e.t}$	The quantity of fuel of type *f* combusted in equipment/vehicle type *e* during reporting period *t*. Expressed volumetric measure (eg, l, m^3. etc.) or mass measure (kg, t, etc.) with appropriate conversion.	Table 65, Table 66, Table 67. Table 68, Table 69, Table 70, Table 71 and Table 72
$CF_{f.e}$	The conversion factor to be used if the units of the activity level do not match those of the emission factor for a particular fuel type f and equipment/vehicle type *e*. Where both the activity level and emission factor are expressed in the same units. CF would be set to 1. Dimensionless.	N/A
J	The relevant GHGs in this methodology: CO_2. CH_4 and N_2O	N/A
T	The reporting period in question, where the value of *t* indicates the number of reporting periods that have occurred since the start of the project up to the reporting period in question.	N/A
F	Fuel type	Table 65, Table 66, Table 67, Table 68, Table 69. Table 70, Table 71 and Table 72

[119] Equation 16 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

E	Equipment/vehicle type	N/A

Data published in the document "Status of energy use in Canadian wood products sector" include the harvest wood processing classified by wood type manufacture (Lumber, ply mills, panel mills). Therefore, the quantity of fuel or energy used to process one cubic meter of harvested wood by manufacture category of wood harvested is taken.

Table 65 - Energy use in lumber manufacture

Fuel type in physucal units	Unit	Lumber manufacture (per m^3)
Electricity	kW.h	70.83
LPG	L	0.19
Diesel	L	2.57
Natural gas	m^3	6.09
Gasoline	L	0.06
Hog fuel (internal)	kg	40.96
Steam (hog fuel) from pulp	MJ	127.29

Table 66 - Energy use in plywood manufacture

Fuel type in physical units	Unit	Plywood manufacture (per m^3)
Electricity	kW.h	103.21
LPG	L	0.27
Diesel	L	1.23
Natural gas	m^3	15.77
Gasoline	L	0.03
Hog fuel	kg	72.42

Table 67 - Energy use in panel manufacture

Fuel type in physical units	Unit	Plywood manufacture (per m^3)
Electricity	kWh	228.90
LPG	L	0.34
Diesel	L	2.30
Natural gas	m^3	15.55
Gasoline	L	0.01
Hog fuel	kg	118.12
Fuel oil	L	0.13

The quantity of fuel or energy used in the activities for chip mills was determined using data from the report ¨Benchmarking energy use in Canadian pulp and paper mills published by Canadian government (2006)[120]. Chips are used to manufacture kraft, newsprint, printing and writing paper, as well as recycled paper. To determinate the quantity of chips that goes to each product category data from Quebec's government (2010)[121] was used.

Table 68 - Type of pulp produced by Québec's pulp and paper industry (mt. 00s)

Type of product	mt[122]	Proportional distribution
Newsprint	3036	40%
Printing and writing paper	2558	33%
Sanitary tissue	334	4%
Other papers	266	3%
Paperboard	1446	19%

Table 69 - Energy consumption for kraft manufacture

Process	Unit	KRAFT manufacture (per t)
Wood preparation	kWh	22.2
Kraft Pulping Continuous	kWh	179.5
Kraft Evaporators	kWh	15.7
Kraft Recausticizing	kWh	24.5
Kraft bleaching - softwood	kWh	32.1
Paper Machine – Kraft Papers	kWh	1021.5
Total	kWh	1295.5

120 Canada Government (2006). Benchmarking energy use in Canadian pulp and paper mills. Available in : https://ressources-naturelles.canada.ca/sites/www.nrcan.gc.ca/files/oee/files/pdf/industrial/benchmark-pulp-paper-e.pdf . Also available in the shared folder \Annex\Sources

121 Ministère des Forêts, de la Faune et des Parcs du Québec 2016. Portrait Statistique Edition 2016. Available in the shared folder \Annex\Sources

122 Metric ton

Table 70 - Energy consumption for newsprint manufacture

Process	Unit	Manufacture (per t)
Wood preparation	kWh	22.2
Mechanical Pulping - TMP for Newsprint	kWh	32
Paper Machine – Newsprint	kWh	565
Total	kWh	619.2

Table 71 - Energy consumption for printing and writing paper manufacture.

Process	Unit	Manufacture (per t)
Recycled Pulp	kWh	344
Paper Machine – Printing and Writing	kWh	662.5
Total	kWh	1006.5

Table 72 - Energy consumption for recycled paper

Process	Unit	Manufacture (t)
Wood preparation	kWh	22.2
Mechanical pulping - TMP for paper	kWh	2661.6
Paper Machine – Printing and Writing	kWh	662.5
Total	kWh	3346.3

Table 64 includes the result of the Baseline Emissions from fossil fuel combustion in vehicles and equipment (BE4) per hectare.

5.1.9 Baseline emission from fertilizer application (BE5)

As silvicultural practices in baseline scenario does not considered fertilization, emissions from this source are considered as zero.

5.1.10 Baseline emissions from biomass burning (BE6)

As silvicultural practices in the baseline does not considered biomass burning, emission from this source is considered as zero.

5.1.11 Baseline emissions from forest fires (BE7)

No emissions from this source have been considered for the baseline. Nevertheless, forest fires will be monitored, and any emission related to this type of event will be included in the project monitoring

report. The possibility of forest fires emissions is also considered in the non-permanence risk analysis calculation and integrated in the buffer determination.

5.1.11.1 Baseline emissions from harvested wood transport (BE8)

These emissions are considered in the section 5.1.7

5.1.11.2 Baseline emissions from harvested wood processing (BE9)

Emissions from harvested wood processing has been calculated jointly with the emission from fossil fuel combustion in vehicles and equipment in section above. This has been done as the governmental source used for this calculation does not split the use of energy between on site and off-site vehicles and equipment, and between manufacturing process. Considering that in both cases the general formula considers the amount of fuel / energy used and the emission factor related to this, this has been considered as a nonmaterial adjustment.

5.1.11.3 Baseline emissions from harvested wood products and residuals anaerobic decay (BE10)

Total CH_4 emissions (accounted as tonnes CO_2e). from wood products in landfills were calculated using the following equation:

$$GHG_{CH4\ PE10/BE10.t} = \sum_{y \le t} RWbiomass_{y.NA} * HWPCH4f_{NA.t-y} + RWbiomass_{y.O} * HWPCH4f_{O.t-y}$$

(Equation 14)[123]

Where:

Parameter	Description	Value
$GHG_{CH4PE10/BE10.t}$	Mass of CH_4 emitted by the project or baseline HWPs in landfills up to year *t*. Expressed in tCO_2e.	Table 74
$RWbiomass_{y.NA}$	The dry mass of the delivered roundwood extracted from the project area in year *y*, used in wood products within North America. Expressed in t.	Table 52
$RWbiomass_{y.O}$	The dry mass of the delivered roundwood extracted from the project area in year *y*, used in wood products offshore. Expressed in t.	Table 52
$HWPCH4f_{NA.t-y}$	The factor derived from Table 73. for the amount of CH_4 (accounted as CO_2e) emitted in a given year, equal to the number of years between harvest and time *t*, for products used in North America.	See Table 73 below (Table 14 of e

[123] Equation 30 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

	Expressed in tCO_2e / t wood biomass delivered.	Methodology VM0034 of VCS)
$HWPCH4f_{0.t-y}$	The factor derived from Table 73. for the amount of CH_4 (accounted as CO_2e) emitted in a given year equal to the number of years between harvest and time *t*, for products used outside of North America. Expressed in tCO_2e / t wood biomass delivered	See Table 73 below (Table 14 of the Methodology VM0034 of VCS)

The raw biomass is multiplied by the percentage of the wood used in north America (Quebec, United States, rest of Canada) and by the percentage of the wood that is exported Offshore.

Table 73. CH_4 emissions by year. in CO_2e. as a percentage of the total wood biomass delivered. by use area – Derivation detailed in Appendix F[124]

Year	North America	Offshore
0	0.001%	0.001%
1	0.015%	0.000%
2	0.080%	0.100%
3	0.136%	0.096%
4	0.182%	0.092%
5	0.221%	0.118%
6	0.254%	0.140%
7	0.281%	0.159%
8	0.302%	0.175%
9	0.320%	0.189%
10	0.334%	0.200%
11	0.345%	0.210%
12	0.354%	0.218%
13	0.361%	0.225%

[124] Derived from Caren C. Dymond, Forest carbon in North America: annual storage and emissions from British Columbia's harvest 1965 - 2065, Carbon Balance and Management 7:8, 2012, Jack K. Winjum, Sandra Brown and Bernhard Schlamadinger, Forest Harvests and Wood Products: Sources and Sinks of Atmospheric Carbon Dioxide, Forest Science 44:2, 1998, and K.E. Skog, Sequestration of carbon in harvested wood products for the United States, Forest Products Journal 58(6):56-72. (2008)

Year	North America	Offshore
14	0.364%	0.230%
15	0.367%	0.234%
16	0.369%	0.237%
17	0.369%	0.239%
18	0.368%	0.240%
19	0.366%	0.240%
20	0.364%	0.240%
25	0.346%	0.232%
30	0.321%	0.216%
35	0.296%	0.198%
40	0.272%	0.179%
45	0.250%	0.161%
50	0.230%	0.145%
55	0.212%	0.130%
60	0.197%	0.116%
65	0.183%	0.105%
70	0.171%	0.094%
75	0.160%	0.085%
80	0.150%	0.076%
85	0.141%	0.069%
90	0.134%	0.062%
95	0.127%	0.057%
100	0.121%	0.051%

Table 74. Emissions from harvested wood products and residuals anaerobic decay (BE10)

Project year	Products used in North America - CH4 emissions by year (tCO_2e) Total	Products used offshore - Gross CH4 emissions by year (tCO_2e) Total	$GHG_{CO2.\ HWP.\ t}$ (tCO_2e/ha)
1 January 2018 -December 31 2018	**0.0**	**0.0**	**0.00**
1 January 2019 -December 31 2019	**0.0**	**0.0**	**0.00**
1 January 2020 -December 31 2020	**0.0**	**0.0**	**-0.02**

1 January 2021 -December 31 2021	**0.0**	**0.0**	**-0.04**
1 January 2022 - December 31 2022	**0.1**	**0.0**	**-0.05**

5.1.12 Total GHG emission reductions and removals in baseline

Finally, calculations of the GHG emission reductions and removals in the baseline for FHI_2017_ERA_001 and FHI_2017_LtPF_001 were done according the following equation:

$\Delta TE_{BS.t}$ is determined for each relevant GHG source as follows:

$$\Delta TE_{BS.t} = \sum_j (TE_{BSj.t} - TE_{BSj.t-1})$$ (Equation 15)[125]

Where:

Parameter	Description	Value
$\Delta TE_{BS.t}$	The net incremental GHG emission reductions by baseline sources of emissions achieved by the baseline during reporting period t. A net increase in total emission reductions is expressed as a positive number. Expressed in tonnes of CO_2e	See Table 75 below
$TE_{BSj.t}$	The total GHG emissions by source j. under the baseline scenario during reporting period t. Expressed in tonnes of CO_2e	See Table 75
$TE_{BSj.t-1}$	The total GHG emissions by source j. under the baseline scenario during reporting period t-1. Expressed in tonnes of CO_2e	See Table 75

The following tables present the net incremental GHG emission reductions by baseline sources of emissions achieved by the baseline during reporting period in FHI_2017_ERA_001 and FHI_2017_LTPF_001.

[125] Equation 33 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Table 75. Total GHG emission reductions and removals in baseline in FHI_2017_ERA_001. FHI_2017_LtPF_001 and Pivot project

	FHI_2017_ERA_001		FHI_2017_LtPF_001		PIVOT PROJECT	
Year	Baseline scenario: to-date GHG emission reductions and removals at year t	Baseline emissions or removals (tCO2e)	Baseline scenario: to-date GHG emission reductions and removalsat year t	Baseline emissions or removals (tCO2e)	Baseline scenario: to-date GHG emission reductions and removalsat year t	Baseline emissions or removals (tCO2e)
1 January 2018 - December 31 2018	24,400	24,400	119,391	119,391	143,792	143,792
1 January 2019 - December 31 2019	26,260	1,860	137,670	18,279	163,931	20,139
1 January 2020 - December 31 2020	26,486	226	137,588	-82	164,074	143
1 January 2021 - December 31 2021	26,744	258	137,705	118	164,449	376
1 January 2022 -18 July 2022	26,805	33	137,480	-123	164,285	-89
Total		**26,777**		**137,583**		**164,360**

5.2 Project Emissions

5.2.1 Calculation of project forest carbon content in pools of FHI_2017_ERA_001 and FHI_2017_LtPF_001 instances (PP1-PP5)

The carbon pools were calculated following the process explained in section 4.3. The following tables present Carbon content (tCO_2e) by pools in FHI_2017_ERA_001 and FHI_2017_LtPF_001 instances.

Table 76 Carbon content (tCO_2e) by pools in FHI_2017_ERA_001 instance

YearDescription	Carbon stock changes in above ground and below ground biomass in the Project (tCO_2e)	Carbon stock chages in wood products in the Project (tCO_2e)	Carbon Stock changes in all pools in the Project (tCO_2e)	GHG emissions as a resul of forest managment activities within the project area in the Project (tCO_2e)	Total carbon stocks in pools
1 January 2018 -December 31 2018	40,207	0	0		40,207
1 January 2019 -December 31 2019	42,045	0	0		42,045
1 January 2020 -December 31 2020	43,882	0	0		43,882
1 January 2021 -December 31 2021	45,720	0	0		45,720
1 January 2022 -18 July 2022	47,558	0	0		47,558

Table 77. Carbon content (tCO2e) by pools in FHI_2017_LtPF_001 instance

YearDescription	Carbon stock changes in above ground and below ground biomass in the Project (tCO_2e)	Carbon stock chages in wood products in the Project (tCO_2e)	Carbon Stock changes in all pools in the Project (tCO_2e)	GHG emissions as a resul of forest managment activities within the project area in the Project (tCO_2e)	Total carbon stocks in pools
1 January 2018 -December 31 2018	206,862	-	0		206,862
1 January 2019 -December 31 2019	219,800	-	0		219,800
1 January 2020 -December 31 2020	232,738	-	0		232,738
1 January 2021 -December 31 2021	245,675	-	0		245,675
1 January 2022 -18 July 2022	258,613	-	0		258,613

Table 78. Carbon content (tCO2e) by pools in Pivot project

Description	Carbon stock changes in above ground and below ground biomass in the Project (tCO2e)	Carbon stock chages in wood products in the Project (tCO2e)	Carbon Stock changes in all pools in the Project (tCO2e)	GHG emissions as a resul of forest managment activities within the project area in the Project (tCO2e)	Total carbon stocks in pools
1 January 2018 -December 31 2018	247,070	0	0	0	247,069
1 January 2019 -December 31 2019	261,845	0	0	0	261,845
1 January 2020 -December 31 2020	276,620	0	0	0	276,620
1 January 2021 -December 31 2021	291,396	0	0	0	291,395
1 January 2022 -18 July 2022	306,171	0	0	0	306,171

5.2.1.1 Project - Harvested Wood Products (In use and in landfill) of FHI_2017_ERA_001 and FHI_2017_LtPF_001 (PP8 and PP9)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2 Project emissions from sources in FHI_2017_ERA_001 and FHI_2017_LtPF_001

Instances aggregators have monitored annually and reported GHG emissions according to the questionnaire designed for this process. According to the Foret Herford report, the project activities within the two instances did not generate emissions during this monitoring period.

If emissions have occurred, the calculation of project emissions would use the same procedures of the baseline emission calculations.

$\Delta TE_{PS.t}$ *is determined for each relevant GHG source as follows:*

$$\Delta TE_{PS.t} = \sum_j (TE_{PSj.t} - TE_{PSj.t-1})$$ (Equation 16)[126]

Where:

Parameter	Description	Value
$\Delta TE_{PS.t}$	The net incremental GHG emission reductions by project sources of emissions achieved by the project during reporting period t. A net increase in total emission reductions is expressed as a positive number. Expressed in tonnes of CO_2e	See Table 79
$TE_{PSj.t}$	The total GHG emissions by source j, under the project scenario during reporting period t. Expressed in tonnes of CO_2e	0
$TE_{PSj.t-1}$	The total GHG emissions by source j, under the project scenario during reporting period t-1. Expressed in tonnes of CO_2e	0

5.2.2.1 Project emissions from fossil fuel production (PE1)

No emissions were reported in this first monitoring period due to the fact that it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.2 Project emissions from fertilizer production (PE2)

5.2.2.3 No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.4 Project emissions from transport of material. equipment. inputs. and personnel to site and emissions from harvested wood transport[127] to site (PE3/PE8)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

[126] Equation 36 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

[127] *Transport of primary HWPs to the location of use, as part of BE11 was considered as zero both on the baseline and project scenarios. This is a conservative measure as baseline emission from this source is reduced by the project.*

5.2.2.5 Project emissions from fertilizer application (PE5)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.6 Project emissions from biomass burning (PE6)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.7 Project emissions from forest fires (PE7)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.8 Project emissions from harvested wood transport (PE8)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.9 Project emissions from harvested wood processing (PE9)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.2.10 Project emissions from harvested wood products and residuals anaerobic decay (PE10)

No emissions were reported in this first monitoring period due to it was not wood volume harvested and reported in the GHG monitoring questionary during this monitoring period.

5.2.3 Total GHG emission reductions and removals in project

Finally, calculations of the GHG emission reductions and removals in the project for FHI_2017_ERA_001 and FHI_2017_LtPF_001 were done according the following equation:

$$TPE_t = \Delta TR_{PP.t} + \Delta TE_{PS.t}$$ (Equation 17[128])

Where:

Parameter	Description	Value
TPE_t	The total project emissions reductions and removal enhancements. considering all pools and sources during the reporting period t. Expressed in tonnes of CO_2e	See Table 79
$\Delta TR_{PP.t}$	The net incremental GHG removals by project pools achieved by the project during reporting period t. A net increase in total removals is expressed as a positive number. Expressed in tonnes of CO_2e	See Table 79
$\Delta TE_{PS.t}$	The net incremental GHG emission reductions by project sources of emissions achieved by the project during reporting period t. A net increase in total emission reductions is expressed as a positive number. Expressed in tonnes of CO_2e	See Table 79

[128] Equation 34 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Table 79. Total GHG emission reductions and removals resulting from the project activity in FHI_2017_ERA_001. FHI_2017_LtPF_001 and Pivot project

	FHI_2017_ERA_001		FHI_2017_LtPF_001		PIVOT PROJECT	
Year	Project scenario: to-date GHG emission reductions and removalsat year t	Project emissions or removals (tCO_2e)	Project scenario: to-date GHG emission reductions and removalsat year t	Project emissions or removals (tCO_2e)	Project scenario: to-date GHG emission reductions and removalsat year t	Project scenarioemissions or removals (tCO2e)
1 January 2018 - December 31 2018	40,207	40,207.2	206,862	206 862.3	247,070	247,070
1 January 2019 - December 31 2019	42,045	1,837.6	219,800	12,938	261,845	14,775
1 January 2020 - December 31 2020	43,882	1,837.6	232,738	12,938	276,620	14,775
1 January 2021 - December 31 2021	45,720	1,837.6	245,675	12,938	291,395	14,775
1 January 2022 -18 July 2022	47,558	1,837.6	258,613	7,054	306,171	8,891
Total		**47,558**		**252,729**		**300,287**

5.3 Leakage

Activity Shifting Leakage

Considering that activity shifting leakage is related to the increase in GHG emissions outside the project area related to land use change activities implemented by the project participants to continue with the activities displaced from the project area, aggregators of the project are monitoring and recording the land use status and report any land use change.

For the current crediting period, FHI has reported no change in the land use status of their whole property and have provide the required form "*Formulaire d'évaluation des risques de fuites dues au changement d'affectation des terres pour les instances à FHI*"[129] to demonstrate that no land use change was expected to occur due to the implementation of the project activities inside their property

[129] Document available in: FHI_2017_ERA_001\Leakage assessment

and to report the status of the areas under their control outside the project area and consider if necessary any potential leakage due to activity shifting.

Table 80. Report of current and future planned changes due to the project implementation in the case of FHI_2017_ERA_001 and FHI_2017_LtPF_001

Aggregator	Instance	Planned changes in land use due to the project implementation	Changes in the land use during the monitoring period
FHI	FHI_2017_ERA_001	No	No
FHI	FHI_2017_LtPF_001	No	No

In the case of FHI_2017_ERA_001 and FHI_2017_LtPF_001 a GIS analysis was carried out to demonstrate that non- Activity shifting leakage took place. In late 2017, FHI formalized the change of use of parcels located in Pivot, as part of this functional zoning map (available online at 2023-04-04), https://forethereford.org/fr/a-propos/planification-integree-2017-2022.php)

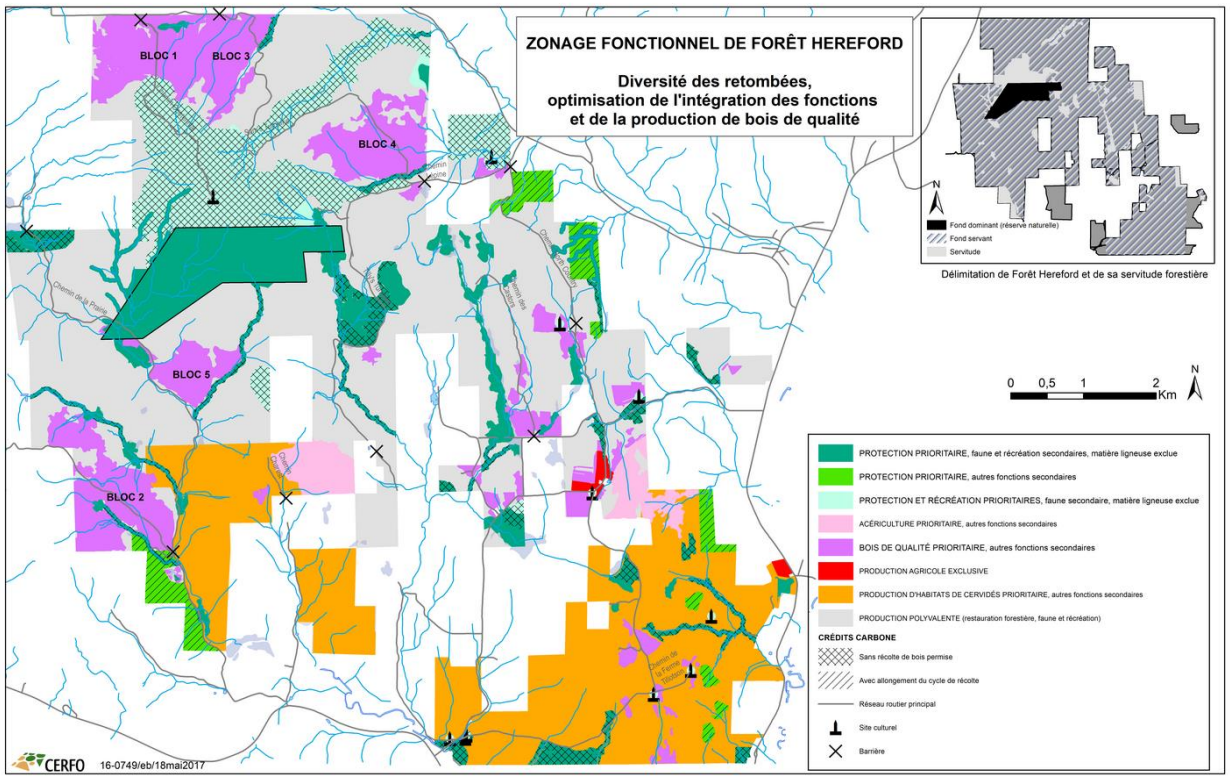


Figure 12. Functional zoning of Forêt Herford properties.

The annual allowable cut (AAC) calculation was also revised as a result of this zoning, as detailed on page 181 of the Zoning Report [130]. pending the official recalculation in 2023.

- The new Forest Management Plan 2023-2033 was released in November 2023. This Plan presents the new calculation of AAC adjusted according to zoning and carbon credit zones. The carbon credit zones are well described in Figure 12.
- Based on this information, it is clearly demonstrated that there is no activity shifting leakages of Hereford Forest properties. The timber harvest was reduced in line with the Pivot Project obligations.

- The potential land use FHI's properties is (accessed online at 2023-04-04, https://forethereford.org/fr/a-propos/index.php):

  - The Hereford Community Forest area is dedicated to the conservation of species, ecosystems, the protection of forest uses and restoration of its forest, the protection of outstanding landscapes, forest and environmental research and education, and extensive recreational activities.
  - As shown on the map of Figure 12 , approximately 95% of the carbon credit zones are located in the forest conservation easement fund, signed in favor of the Nature Conservancy of Canada. The forestry use of these areas is protected in perpetuity, which adds to the low risk of leakage.

- A conservation easement is a voluntary, legal, and perpetual agreement between a landowner and a conservation organization that permanently restricts the use of land to protect its conservation values (also known as a conservation agreement or covenant). A conservation easement restricts activities on the land (or part of it). Each of the restrictions of a conservation easement is customized according to the property in question, the natural characteristics to be conserved and the interest of the owner.

- The easement in force in the Hereford Forest, signed on June 26, 2013, is summarized in a public document and is available online on the FHI website: https://forethereford.org/fr/foret-conservation/documents/Resume_servitude.PDF . The main objectives of the easement are to ensure the sustainable use of the resources and the protection of the key natural elements of the site: water, forest cover, and rare and fragile elements, such as species in precarious situations or steep slopes.

[130] Zoning Proposal Report, August 2017, see Table 28 *Forestry opportunity before and after zoning* (page 181), accessed March 2024.

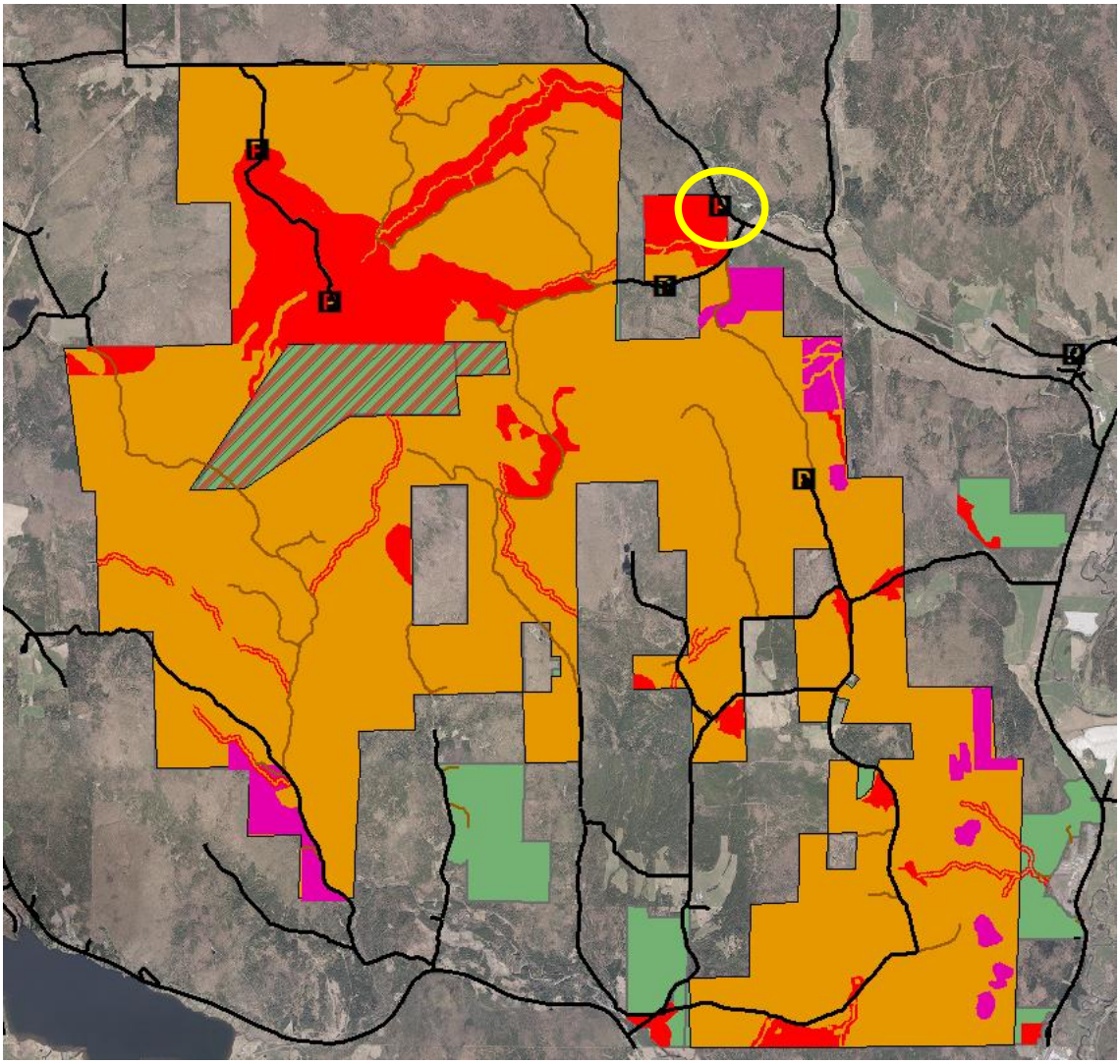


Figure 13. Monitoring leakages inside the Fôret Herford (0.32 ha of land use change in lot 2291-41-3118 East Hereford).

Due to COVID-19, there was an explosion of demand for hiking in 2020 and 2021. The municipal regulations do not allow parking near Coaticook Road, so FHI was forced to expand this parking to the maximum limit already authorized by the Commission de protection du terre Agricole du Québec. Already documented in the Report Presentation of the origin of changes to FHI instances (2022-08-18).

Figure 14. Overview of the Origin of Changes to FHI Instances (2022-08-18)

In the case of instances ACA_2021_ERA_002, ACA_2021_LTPF_002 and SMB_2022_LTPF_003, the have all presented the form "*Evaluation des fuites dues au changement d'affectation des terres*"[131]. showing evidence that no change in the land use inside the properties under their control are expected to occur due the implementation of the project.

Table 81. Report of future planned changes due to the project implementation In the case of instances ACA_2021_ERA_002, ACA_2021_LTPF_002 and SMB_2022_LTPF_003,

Aggregator	Instance	Planned changes in land use due to the project implementation	Changes in the land use during the monitoring period
ACA	ACA_2021_ERA_002	No	N.A.
ACA	ACA_2021_LTPF_002	No	N.A.
SMB	SMB_2022_LTPF_003	No	N.A.

Market leakage

ERA activities may lead to minimal reduction in total harvest over time, the impact on the total volumes of timber over the long term is expected to be non-significant when compared to the size of the market. Impact assessment for each ERA instance were made to determine if the 5% benchmark was attained as defined by the design document of the project. In both cases, impact was far lower than 5% (See Table 82 and Table 83),

The significance of the reduction of the timber production for each instance was assessed for instances FHI_2017_ERA_001.and ACA_2021_ERA_002. Considering that the total size of the timber market in the province of Quebec reached 25.13 millions m^3 in year 2020[132], and an ultra-conservative scenario where all harvestable timber, according to baseline conditions, is extracted on each instance on the

[131] Documents available in: ACA_2021_ERA_002\Leakage assessment, ACA_2021_LtPF_002\Leakage assessment, SMB_2022_LTPF_003\Leakage assessment

[132] Ministère des Forêts, de la Faune et des Parcs du Québec (2020) Portrait Statistique Edition 2020. Available in : https://cdn-contenu.quebec.ca/cdn-contenu/forets/documents/entreprises/RA_portrait_statistiques_industries_forestieres_MRNF-2020.pdf. Alaso available in: Annex\Sources

same year, the impact of the instance over the market size by years 1. 16 and 31 will be far below the 5% benchmark defined to consider this leakage (see Table 82 and Table 83)

Table 82. Impact of PIVOT activities for FHI_2017_ERA_001. on the Quebec timber market

Project year	1	16	31
Estimate of timber volume reduction caused by the instance (m^3)[133]	4,399.99	7,612.50	8,330.32
Percentage of the market volume (%)	0.02%	0.03%	0.03%

Table 83. Impact of PIVOT activities for ACA_2021_ERA_002. on the Quebec timber market

Project year	1	16	31
Estimate of timber volume reduction caused by the instance (m^3)[134]	10,615	19,685	20,420
Percentage of the market volume (%)	0.04%	0.08%	0.08%

The significance of the reduction of the timber production was also assessed for instances FHI_2017_LTPF_001. ACA_2021_LTPF_002 and SMB_2022_LTPF_003 as the process above explained for ERA activities.

Table 84. Impact of PIVOT activities for FHI_2017_LTPF_001. on the Quebec timber market

Project year	1	16	31
Estimate of timber volume reduction caused by the instance (m^3)[135]	21,906.30	37,900.48	41,474.30
Percentage of the market volume (%)	0.09%	0.15%	0.17%

[133] See column CU of the sheet « baseline data> of the file Calculs_Net_Foret_ForetHerford_ERA_LtPF_18Nov2019_v2 available in : IFHI_2017_ERA_001\Baseline

[134] See column CX of the sheet « baseline dat> of the file / Calculs_Net_VCU_ACA_ERA_LtPF_adjusted, available in :INFO_AENOR\ACA_2021_ERA_002\BL_ACA_2021_ERA_002

[135] INFO_AENOR\SMB_2022_LTPF_003\BL_SMB_2022_LtPF_002\VCUs Ex-ante estimation/ Calculs_Net_Foret_Bromont_LtPF_JUillet2022_v2

Table 85 Impact of PIVOT activities for ACA_2021_LTPF_002. on the Quebec timber market

Project year	1	16	31
Estimate of timber volume reduction caused by the instance (m^3)[136]	13,417	26,123	27,054
Percentage of the market volume (%)	0.05%	0.10%	0.11%

Table 86 Impact of PIVOT activities for SMB_2021_LTPF_003. on the Quebec timber market

Project year	1	16	31
Estimate of timber volume reduction caused by the instance (m^3)[137]	6 446.99	12 057.17	12 607.13
Percentage of the market volume (%)	0.03%	0.05%	0.05%

Even if the impact of the project in the production of timber on each of the project instances in the Quebec timber market was clearly not significant and it is clear that none of these instances are able to break the equilibrium of the market demand, the provisions set out in Section 8.4.1.2 of VM0034, v.2.0, were applied to assess and determine market leakage using the method 3, for the instances under verification (FHI_2017_ERA_001, and FHI_2017_LtPF_001). When using this method, project proponents must provide justification and evidence of how the leakage discount factor is defined, following the VCS Leakage Discount Factor determination, provided in the Table 3 of the VCS Methodology Requirements v4.4 document,

In the case of the instance FHI_2017_ERA_001, the leakage Discount Factor was defined as 0%, as the project will have minimal effect on the reduction of total timber harvested compared to the baseline harvested volume (13.1%) over the project lifetime.

[136] Pivot project -credit estimation tool

[137] Pivot project -credit estimation tool

Table 87. Projected Total harvested Volume in the baseline scenario vs Project Scenario during the project length time in FHI_2017_ERA_001.

	Baseline scenario	Project scenario
Projected total harvested volume (m^3)	26 298[138]	22 851[139]
Reduction in timber harvesting (%)	13.1%	

For FHI_2017_LtPF_001 the leakage discount factor was defined as 20%. IFM-LtPF activity substantially reduces harvest levels permanently compared to the baseline activity and the ratio of merchantable biomass to total biomass is higher within the area to which harvesting is displaced compared to the project area.

In this case, the potential area to which harvesting would be displaced was defined as the corresponding Quebec administrative region. Timber market from private forests is defined at the administrative region level and monitoring of harvesting volumes are managed at the same level.

Additionally, the Regional Private Forest Agencies, which cover the territories of their corresponding administrative regions, define regional planning guidelines for the private forest territory and manage the technical and financial assistance programs for carrying out silvicultural work for forest owners. The calculation of harvesting volume in small private forests is also under their responsibility and is therefore made based on the administrative region[140]. Also, the Regional Forest producers' union represent forest owners in the region concerned to various bodies, provide technical service training, and administer the marketing regulations for forest products, particularly through collective marketing plans. The regional union can notably negotiate sales contracts for producers in its region[141].

In this context, the potential leakage area to which harvesting could be displaced from FHI_2017_LtPF_001 are the mature (> 50 years old or JIN[142] Forest) private forests of the Estrie Region. To identify these areas, the SIEF data was downloaded from the Forêt Ouverte[143] portal to make a clip between the Estrie region shpfile and the SIEF shpfiles (sheets PRODUITS_IEQM_21E_10, PRODUITS_IEQM_31H_10). Subsequently, the clipping resulting shpfile is redefine, deleting the areas classified as non-forest, as well as the forests younger than the class age 50 were commercial harvesting is not likely to occur (see Figure 15). The next step was to determine the areas by forest type

[138] See sheet "Baseline Data" cell "CS 203" of the file "Calculs_Net_Foret_ForetHerford_ERA_LtPF_BaseLine"

[139] See sheet "Project Data" cell "DL 204" of the file "Calculs_Net_Foret_ForetHerford_ERA_LtPF_BaseLine

[140] https://www.foretprivee.ca/jamenage-ma-foret/entreprises-en-foret-privee/agences-regionales-de-mise-en-valeur-de-la-foret-privee/

[141] https://www.foretprivee.ca/je-vends-mon-bois/roles-du-syndicat-de-producteurs-forestiers/

[142] *jeune inéquienne*- young uneven-aged

[143] https://www.foretouverte.gouv.qc.ca/

(conifer, mixed, broadleaf) and age class to estimate the weighted average of merchantable biomass per hectare in the entire leakage potential area according to the data of Estrie private forest development agency in the protection and development plan for the Estrie private forest (see Table 88).

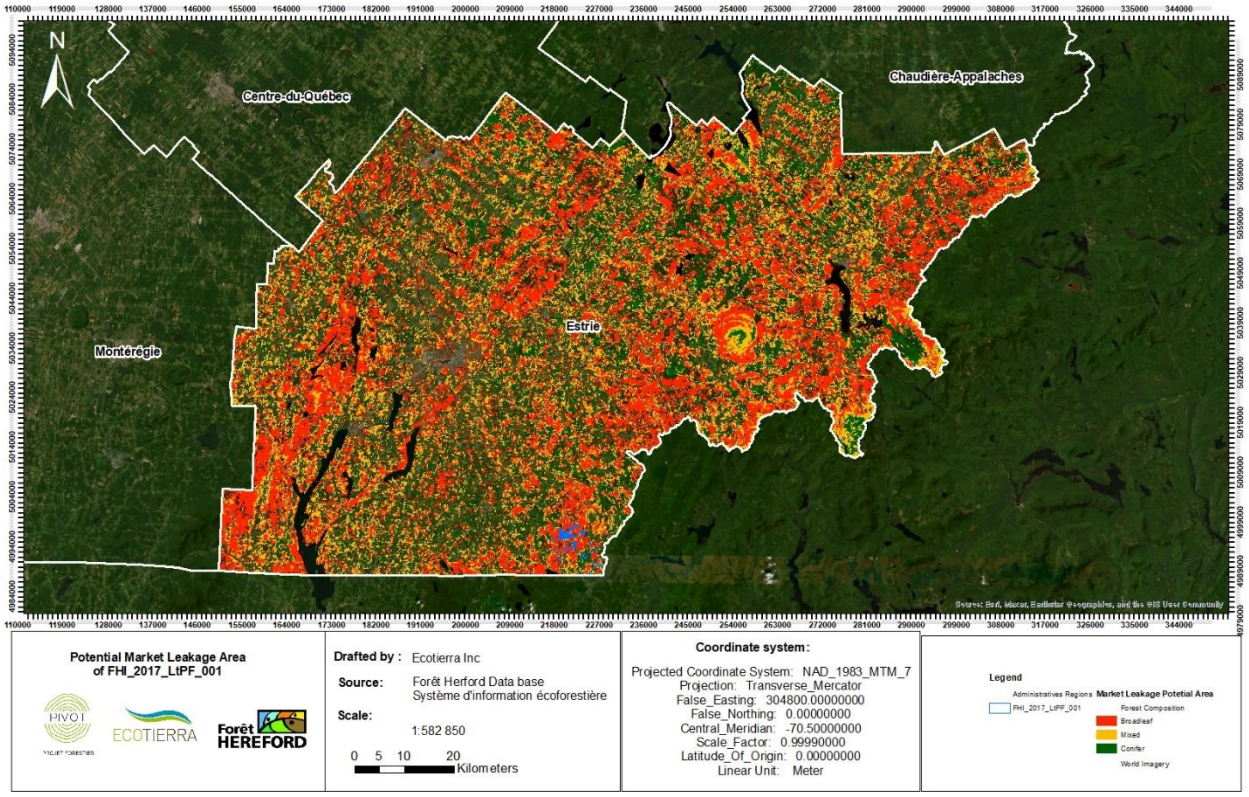


Figure 15. Potential Market Leakage Area of FHI_2017_LtPF_001

Table 88. Weighted average of Merchantable biomass by forest population and Age class in the potential market leakage area

Forest Population	Age class	Area_ (ha)	Percentage	Average (tdm/ha) [144]	Weighted average (tdm/ha)
Broadleaf	JIN/JIR	141 788.70	50%	102.0	110.22
	50	32 633.70	12%	88.8	
	70	5286.5	2%	134.0	
	90	116.7	0%	163.0	
	VIN	101 766.30	36%	176.0	

[144] Values calculated with the values from the Estrie Private Forest Development Agency (the Agence de mise en valeur de la forêt privée de l'Estrie. 2017. Plan de protection et de mise en valeur de la forêt privée de l'Estrie. 453 p. Tableau 7.16 Available in: https://agenceestrie.qc.ca/pdf/PPMV_1-12_VR_oct2017.pdf) and the wood density (see table 20)

Mixed	JIN/JIR	124 500.90	54%	89.5	67.62
	50	58 181.40	25%	86.3	
	70	18424.7	8%	93.3	
	90	1413.5	1%	106.0	
	VIN	28 988.60	13%	107.2	
Conifer	JIN/JIR	849.40	2%	98.4	79.32
	50	50.00	0%	95.3	
	70	18424.7	37%	99.6	
	90	1413.5	3%	99.0	
	VIN	29 162.60	58%	105.7	

Finally, according to the forest composition in FHI_2017_LtPF_001, the trade volume resulting from inventory data processing in Artemis and the wood density (see table 20), the total biomass (aboveground living biomass) for the entire instance is calculated.

The total biomass of each area is estimated based on the adjusted biomass curve based on the inventory carried out for the baseline adjustment (see section 5.1.3) and the composition of the forest in terms of population and age class specific to each area (see Table 89) .

Table 89. Composition of the forest in terms of population and age class in the potential leakage area and LtPF instance.

		Potential leakage area	LtPF instance
Area (ha)		139 487.02	665.03
Forest population composition (%)	**Conifers**	9%	3%
	Mixed	41%	49%
	Broadleaf	50%	48%
Forest class age composition (%)	**1-20**	0.0%	5.5%
	21-40	0.0%	3.2%
	41-60	63.6%	87.8%
	61-80	7.5%	0.9%

	>80	28.9%	2.6%

As can be seen in Table 90, the ratio of merchantable biomass to total biomass is higher within the potential leakage area to which harvesting is displaced compared to the project area. Therefore, 20% was the VCS leakage discount factor selected to be used as the Market leakage factor (LEF_M) in the following equation:

Table 90. Merchantable biomass and total biomass in the potential leakage area and in the FHI_2017_LtPF_001 instance

Area	Merchantable biomass (tdm average /ha)	Total biomas in leakage area (tdm average /ha)	**Ratio** (%)
Potential Leakage area	89.97	154.13	58%
LtPF_instance	56.94	144.27	39%

$$\mathrm{LEM,t} = \max\{0, \mathrm{LEF_M} \times \mathrm{TPE_t}\} \quad \text{(Equation 18)}^{145}$$

Where:

Parameters	Description	Value
$LE_{M,t}$	Total increase in project emissions due to market leakage from all affected carbon pools and sources during reporting period t. Expressed in tCO_2e.	
LEF_M	Market leakage factor, expressing the percentage of the total increase in project emissions due to market leakage during reporting period *t*. Expressed in %	20% according to Table 3 of the VCS Methodology Requirements 4.4

[145] Equation 44 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

TPE_t	The total project emissions reductions, considering all pools and sources during reporting period t. Expressed in tCO_2e	See Equation 17 of this document

5.4 Net GHG Emission Reductions and Removals

.

The following equation was used to calculate the net GHG emission reductions and removal:

$$\mathbf{NPE_t = TPE_t - TBE_t - LE_{PE16.t}}$$ (Equation 19)[146]

Where:

Parameter	Description	Default Value
NPE_t	Net *GHG* emissions reductions and removals of the project during reporting period t. Expressed in tCO2e.	Table 93 and Table 94
TPE_t	The total project emissions reductions. considering all pools and sources during reporting period t. Expressed in tCO_2e.	Table 93 and Table 94
TBEt	The total baseline emissions reductions. considering all pools and sources during reporting period t. Expressed in tCO_2e	Table 93 and Table 94
$LE_{PE16.t}$	The amount of GHG. emitted from Leakage affected carbon pools during reporting period t. Only relevant for CO_2; otherwise. set to zero. Expressed in tCO_2e.	Table 93 and Table 94

5.4.1 *Net change in carbon stocks*

For quantifying the number of buffer credits to be withheld in the AFOLU buffer account. net change in carbon stocks was calculated using the following equation:

$$NTR_t = \Delta TR_{PP.t} - \Delta TR_{BP.t}$$ (Equation 20)[147]

[146] Equation 45 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

[147] Equation 46 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Where:

Parameter	Description	Value
NTR_t	Net change in carbon stocks during reporting period . Expressed in tCO_2e.	Table 93 and Table 94
$\Delta TR_{PP,t}$	The net incremental GHG removals by project pools achieved by the project during reporting period t. A net increase in total removals is expressed as a positive number. Expressed in tCO_2e.	Table 93 and Table 94
$\Delta TR_{BP,t}$	The net incremental GHG removals by baseline pools achieved by the project during reporting period t. A net increase in total removals is expressed as a positive number. Expressed in tCO_2e.	Table 93 and Table 94

Non-Permanence Risk

According to the requirement of the VCS, the non permanence risk tool was used to determinate the non-permanence risk rating used. It is important to note that this analyse was carried out for two instances (FHI_2017_LTPF_001 and FHI_2017_ERA_001). The non permanent risk reports document and substantiate the risk and/or mitigation for each internal risk factor and relevant documentary evidence. The following table present the overall non performance risk rating and buffer determination for each instance:

Table 91. Overall non-permanence risk rating and buffer determination for each instance.

Risk Category		FHI_2017_ERA_001 Rating	FHI_2017_LTPF_001 Rating
a)	Internal risk	0.00	0.00
b)	External risk	5.00	5.00
c)	Natural Risk	2.50	2.50
Overall risk rating (a + b + c)		10	10

Long-term Average GHG Benefit

According to the VCS Standard 4.5, where IFM projects meet or exceed the harvesting activity definition, the long-term average shall be applied. In this sense, harvesting activity is defined as the harvest of trees, vegetation, or other biomass, which results in a reduction by more than 20% of carbon stocks over a five-year period that starts when a reduction of carbon stocks occurs (VCS program definitions 4.3v).

The following table presents the analysis of the viability of the application of the LTA in FHI_2017_ERA_001. Column "Change in carbon stock (tCO_2e)"[148] is the result of the difference between t et t-1. When there is a negative change in the carbon stocks, an analysis of the Δ delta in the carbon stocks (expressed in %) over a five-year is done. If the difference between carbon stocks between t and t+5 is >=-20%, the LTA shall be omitted. In the case of FHI_2017_ERA_001, the maximum carbon loss over a five-year period is -15%.

Table 92. Analysis of the viability of the application of the LTA in FHI_2017_ERA_001

Project year	Change in carbon stock (tCO_2e)	Carbon stock loss after harvesting (%)	Δ Delta in the carbon stocks over a five-year (%)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	-1,151.54	-2%	-11%
21	-3,803.76	-8%	-8%
22	-49.89	0%	0%
23	-7.60	0%	0%
24	-7.44	0%	0%
25	3.26	0%	1%
26			

[148]See "column U47 to Column X47" "in the Balance ERA" sheet in the excel file "Calculs_Net_Foret_ForetHerford_ERA_LtPF_BaseLine". Available in: \FHI_2017_ERA_001\Verif_calculations_2022\GHG models

Project year	Change in carbon stock (tCO_2e)	Carbon stock loss after harvesting (%)	Δ Delta in the carbon stocks over a five-year (%)
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40	-600.30	-1%	-2%
41	-600.32	-1%	-1%
42			
43			
44			
45			
46			
47			
48			
49			
50	-3,339.94	-7%	-13%
51	-2,471.38	-5%	-7%
52	-200.04	0%	-2%
53	-152.91	0%	-1%
54	-144.90	0%	-1%
55	-154.50	0%	-1%
56	-54.73	0%	-1%
57	-48.45	0%	-3%
58	-43.47	0%	-3%
59	-39.06	0%	-3%
60	-237.41	-1%	-3%
61	-860.42	-2%	-3%
62	-80.18	0%	-1%
63	-66.50	0%	-1%
64	-62.34	0%	-1%
65	-56.26	0%	0%
66	-39.00	0%	16%
67	-36.24	0%	18%
68	-33.33	0%	18%
69			

Project year	Change in carbon stock (tCO_2e)	Carbon stock loss after harvesting (%)	Δ Delta in the carbon stocks over a five-year (%)
70			
71			
72			
73	-19.43	0%	0%
74	-18.87	0%	0%
75	-16.16	0%	0%
76			
77			
78			
79			
80	-3,092.50	-6%	-15%
81	-3,426.60	-8%	-9%

Where: (-) means loss

$$NPE_t = TPE_t - TBE_t - LE_{PE16,t} \quad \text{(Equation 21[149])}$$

Where:

$Credits_t$	Total amount of credits available for reporting period t.
NPE_t	Net change in GHG emissions reductions and/or removals for reporting period t. Expressed in tCO_2e.
TPE_t	The total project emissions reductions, considering all pools and sources during reporting period t. Expressed in tCO_2e.
TBE_t	The total baseline emissions reductions, considering all pools and sources during reporting period t. Expressed in tCO_2
$LE_{PE16,t}$	The amount of GHG, emitted from Leakage affected carbon pools during reporting period t. Only relevant for CO_2; otherwise, set to zero. Expressed in tCO2e.

FHI_2017_ERA_001

[149] Equation 45 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Emission reduction or removals for this monitoring period Net GHG were calculated as 20,780 tCO_2e. According to the LTA applicability analyse, it is no necessary to considered it. Therefore, the Equation 17 (equation 49 from the VM0034) is applied in order to get the total amount of credits available for reporting t.

$$Credits_t = NPE_t - (Risk \times NTR_t) \text{ (Equation 22}^{150}\text{)}$$

Where:

$Credits_t$	Total amount of credits available for reporting period t.
NPE_t	Net change in GHG emissions reductions and/or removals for reporting period t. Expressed in tCO_2e.
Risk	Non-permanence risk rating as determined using the AFOLU Non-Permanence Risk Tool
NTR_t	Net change in carbon stocks for reporting period t. Expressed in tCO_2e.

[150] Equation 49 of VM0034 Candian forest carbon offset methodology. Available in: https://verra.org/wp-content/uploads/VM0034-Canadian-Forest-Carbon-Offset-Methodology-v2.0.pdf

Table 93. Net GHG Emission Reductions and Removals for Instance FHI_2017_ERA_001

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)	Buffer pool allocation	VCUs eligible for issuance
1 January 2018 - December 31 2018	24,400	40,207	0	15,807	1,581	14,226
1 January 2019 - December 31 2019	1,860	1,838	0	-22	0	0
1 January 2020 - December 31 2020	226	1,838	0	1,612	161	1,451
1 January 2021 - December 31 2021	258	1,838	0	1,580	158	1,422
1 January 2022 - 18 July 2022	33	1,838	0	1,804	180	1,624
Total	26,777	47,558	-	20,780	2 080.	18,723

FHI_2017_LtPF_001

Emission reduction or removals for this monitoring period were calculated as 64,601 - GHG for this instance for the monitoring period 2018- July 18th 2022 (see Table 94).

Table 94. Net GHG Emission Reductions and Removals for instance FHI_2017_LtPF_001

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)	Buffer pool allocation	VCUs eligible for issuance
1 January 2018 -December 31 2018	119,391	206,862	41,372	46,099	4,610	41,489
1 January 2019 -December 31 2019	18,279	12,938	2,588	-7,929	-	-
1 January 2020 -December 31 2020	-8	12,938	2,588	10,433	1,043	9,389
1 January 2021 -December 31 2021	118	12,938	2,588	10,233	1,023	9,209
1 January 2022 -18 July 2022	123	7,054	1,411	5,766	577	5,189
Total	137,583	252,729	50,546	64,601	7,253	65,277

PIVOT project during this monitoring project generated a total GHG emissions reduction or removal of 84,000 tCO_2e as it is presented in the following table.

Table 95. Net GHG Emission Reductions and Removals for instance PIVOT project

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)	Buffer pool allocation	VCUs eligible for issuance
1 January 2018 -December 31 2018	143,791	247,069	41,372	61,906	6 191	55,715
1 January 2019 -December 31 2019	20,139	14,776	2,588	-7,951		
1 January 2020 -December 31 2020	144	14,776	2,588	12,045	1 204	10,840
1 January 2021 -December 31 2021	376	14,776	2,588	11,813	1 181	10 631
1 January 2022 -18 July 2022	-90	8,892	1,411	7,570	757	6,813
Total	164,360	300,287		85,381	9,333	84,000

The following table present the estimated ex-ante GHG emission reductions and removals and the achieved emission reductions and removals for this monitoring period. The quantities of GHG emission reductions and removals are the total quantities before any deductions for buffer credits.

Ex-ante emissions reductions/removals	Achieved emissions reductions/removals	Percent difference	Justification for the difference
1,049,128	84,000	-91.99%%	The implementation of the project, mainly the inclusion of new instances between 2018 and 2021 could not be executed as expected due to the continuous administrative delays in the project registration process. This led Ecotierra and the participants to prefer to wait until the project is registered before relaunching the inclusion to avoid image risks and unnecessary costs between the parties. The numbers of this first verification correspond only to the areas included at the time of validation and registration of the project (the first 2 instances owned by Forêt Hereford).

APPENDIX 1: ANNEX DOCUMENTS

FHI_2017_ERA_001

Baseline

- Calculs_Net_Foret_ForetHerford_ERA_LtPF_18Nov2019_v2.xls

Financial

- Financial_analyse_BL_FH_ERA_updated.xls.
- Financial_analyse_IFM_LtPf_FH_updated.xls

Leakage assessment documents

- Changements_Fuites_FHI_2022.doc

Legal documents

- Hereford_Titles file
  - ✓ Acte de donation_juin2013_non signé.pdf
- Entente Pivot-projet_Version_revisee_signée.pdf
- FHI-Planification-integree-2017.pdf
- FHI-Rapport-Foret-Hereford-volet-portraits-zonage.pdf

Monitoring Forest Inventory documents

- auto_stratification
- Données_inventaire_vérif
- plan_sondage
- FHI_ERA_09-12-2022

Monitoring GHG sources

- 2022
  - ✓ Vieux_Sentiers_bois_15_ans
  - ✓ 11.1 Monitoring_FHI_Jan-July_2022
  - ✓ 11.1 Monitoring_FHI_July_dec_2022
  - ✓ arbres_champignons_LTPF

- ✓ notes_monitoring_2022
- 11.1 Monitoring_FHI_2018.xls
- 11.1 Monitoring_FHI_2019.xls
- 11.1 Monitoring_FHI_2020.xls
- 11.1 Monitoring_FHI_2021.xls

Plant d'amenagement

- Plan_d'Aménagement_Fort_Forêt_Hereford_2013-2023.pdf

Public information

- Rencontres_Échanges_FHI_Ecotierra_Pivot.pdf

Risk Assessment

- Annex I Curriculum Vitae File
- Annex II Distance between parthners and Ecotierra
- Annex III Legal documents
- Annex IV Political Risk
- Annex V. Financial Viability
- Annex VII Sopfeu
- VCS-Non-Permanence-Risk-Report-Template-Short-Form-v4.0_IFM_ LtPF
- VCS-Risk-Report-Calculation-Tool-v4.0_FH_LtPF

SIG

- FHI_2017_LtPF_001.kml
- IFM_LtPF_project.shpfile
- FH location_LtPF.jpg
- FH location_LtPF_plots_location.jpg

Verif_calculations_2022

- GHG models
  - ✓ Calculs_Net_Foret_ForetHerford_ERA_LtPF_BaseLine.xls
  - ✓ Net_Removals and Reductions_FHI_2017_ERA_001_V2.xls
- Artemis_ERA_Verif_2022

- FHI_2017_LtPF_001

Baseline

- Calculs_Net_Foret_ForetHerford_ERA_LtPF_18Nov2019_v2.xls

Financial

- Financial_analyse_BL_FH_ERA_updated.xls.
- Financial_analyse_IFM_ERA_FH_Updated.xls

Leakage assessment documents

- Changements_Fuites_FHI_2022.doc

Legal documents

- Hereford_Titles file
  - ✓ Acte de donation_juin2013_non signé.pdf
- Entente Pivot-projet_Version_revisee_signée.pdf
- FHI-Planification-integree-2017.pdf
- FHI-Rapport-Foret-Hereford-volet-portraits-zonage.pdf

Monitoring Forest Inventory documents

- auto_stratification
- Données_inventaire_vérif
- plan_sondage
- FHI_ERA_09-12-2022

Monitoring GHG sources

- 11.1 Monitoring_FHI_2018.xls
- 11.1 Monitoring_FHI_2019.xls
- 11.1 Monitoring_FHI_2020.xls
- 11.1 Monitoring_FHI_2021.xls

Plant d'amenagement

- Plan_d'Aménagement_Fort_Forêt_Hereford_2013-2023.pdf

Public information

- Rencontres_Échanges_FHI_Ecotierra_Pivot.pdf

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- Annex VII Sopfeu
- VCS-Non-Permanence-Risk-Report-Template-Short-Form-v4.0_IFM_ERA
- VCS-Risk-Report-Calculation-Tool-v4.0_FH_ERA

SIG

- FHI_2017_ERA_001.kml
- IFM_ERA_project.shpfile
- Original_shp_file
- FH location_ERA.jpg
- FH location_ERA_plots_location.jpg

Verif_calculations_2022

- GHG models
  - ✓ Calculs_Net_Foret_ForetHerford_ERA_LtPF_BaseLine.xls
  - ✓ Net_Removals and Reductions_FHI_2017_ERA_001_V2.xls
- Artemis_LtPF_Verif_2022

- ACA_2021_ERA_002

BL_ACA_2021_ERA_002

- Artemis Data
- Data per pebleument
- Données_terrain_original
- Financial_calculations
- R
- résultats_controle_qualité

✓ ACA Baseline adjustment_Draft ENG.doc
✓ Calculs_LTA_Foret_ACA_ERA_Baseline_80ANS.xls
✓ Calculs_Net_VCU_ACA_ERA_LtPF_adjusted.xls
✓ Courbes_ajustment_ACA2021.xls

Elegibility Analyse
- auto_stratification_Kartoum
- plan_sondage
- shp_final
- ✓ 1.6 COUT REVENU_ACA_Karthoum.xls
- ✓ 6.5 ENGAGEMENT PRÉLIMINAIRE Khartoum.xls
- ✓ 7.3 Rapport_éligibilité_ACA_2021-ERA-001.doc
- ✓ ACA_2021_données_terrain_ERA.xls
- ✓ ACA_ERA_07-12-2022,pdf
- ✓ ACA_ERA_artemis.xls
- ✓ Artemis.xls
- ✓ Calculs_Net_VCU_ACA_Karthoum.xls
- ✓ Formulaire_Terrain_-_Plan_de_Suivi_GES__20220120_era.xls

GIS
- ✓ ACA_ERA_shp_final_NAD_1983_MTM_8.shpfile
- ✓ ACA_2021_ERA_002.kml
- ✓ Corrido appalachain location_ERA.jpg
- ✓ Corrido appalachain location_ERA_plots_location.jpg

Leakage assessment
- ✓ Changements_Fuites_ACA_2022.doc

Legal Documents
- ✓ Land Titles
- ✓ Prior_considerations_ACA-ERA
- ✓ 6.5 ENGAGEMENT PRÉLIMINAIRE_2021_LtPF-001(en cours)(signed)_AnnexeA
- ✓ Convention de participation
- ✓ 9Directives_ACA_juin2022_AnnexeF.signée 20220802
- ✓ Date_debut_VCU_ACA_ERA
- ✓ QuestionnaireEligibilté par proprieté

Public consultation
- ✓ Rencontres_Échanges_ACA_Ecotierra_PivotLELM

Risk assessment
- ✓ Annex I Curriculum Vitae
- ✓ Annex II Distance between parthners and Ecotierra
- ✓ Annex III Legal documents
- ✓ Annex IV Political Risk
- ✓ Annex V. Financial Viability
- ✓ Annex VII Sopfeu
- ✓ VCS-Non-Permanence-Risk-Report-Template-Short-Form-v4.0_ACA_ERA_V4.doc
- ✓ VCS-Risk-Report-Calculation-Tool-v4.0_ACA_ERA.xls

- ACA_2021_LTPF_002

BL_ACA_2021_LtPF_002

- Artemis Data
- Data per pebleument
- Données_terrain_original
- Financial_calculations
- R
- résultats_controle_qualité

✓ ACA Baseline adjustment_Draft ENG.doc
✓ Calculs_LTA_Foret_ACA_ERA_Baseline_80ANS.xls
✓ Calculs_Net_VCU_ACA_ERA_LtPF_adjusted.xls
✓ Courbes_ajustment_ACA2021.xls

Elegibility Analyse

- 5_propriétés
- area_proprio
- artemis_data
- plan_sondage

1.6 COUT REVENU_ACA_5autres.xls
6.5 ENGAGEMENT PRÉLIMINAIRE_2021_LtPF-001.xls
7.3 Rapport_éligibilité_2021-LtPF-001.doc
ACA_2021_données_terrain_LtPF.doc
ACA_LTPF_07-12-2022.pdf
Calculs_Net_VCU_ACA_5autres.xls

GIS

✓ ACA_LtPF.shp
✓ ACA_2021_LtPF_022kml
✓ Corridor appalachain location_LtPF.jpg
✓ Corridor appalachain location_plots location.jpg

Leakage assessment

✓ Changements_Fuites_ACA_2022.doc

Legal Documents

✓ Land Titles
✓ Prior_considerations_ACA-LTPF
✓ 6.5 ENGAGEMENT PRÉLIMINAIRE_2021_LtPF-001(en cours)(signed)_AnnexeA
✓ Convention de participation
✓ 9Directives_ACA_juin2022_AnnexeF.signée 20220802
✓ Date_debut_VCU_ACA_ERA

- ✓ QuestionnaireEligibilté par proprieté

Public consultation

- ✓ Rencontres_Échanges_ACA_Ecotierra_PivotLELM

Risk assessment

- ✓ Annex I Curriculum Vitae
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- ✓ Annex V. Financial Viability
- ✓ Annex VII Sopfeu
- ✓ VCS-Non-Permanence-Risk-Report-Template-Short-Form-v4.0_ACA_LTpf_V4.doc
- ✓ VCS-Risk-Report-Calculation-Tool-v4.0_ACA_LtPf.xls

SMB_2022_LTPF_003

BL_SMB_2022_LtPF_003

- ✓ Artemis_Mont_brome
- ✓ Données_terrain_avril22
- ✓ Financial_calculations
- ✓ Photos_instances
- ✓ quality_control
- ✓ VCUs Ex-ante estimation
- ✓ Ajustement_ligne_Base_Mont_Bromont.doc
- ✓ Bromont Baseline adjustment_Draft ENG_versioninitial.doc

Elegibility Analyse

- ✓ auto_stratification
- ✓ plan_sondage
- ✓ 1.6 Modelisation-COUT REVENU_Mt_Bro.xls
- ✓ 6.5 ENGAGEMENT PRÉLIMINAIRE_Mt_Brome(en cours)(signed).pdf
- ✓ 7.3 Rapport_éligibilité_2022-LtPF-001.doc
- ✓ Calculs_VCU_nets_Mont-Brome_instFinal.xls
- ✓ Mont_Brome_08-12-2022.pdf

Leakage assessment

Changements_Fuites_Mont-Brome_2022.doc

Legal Documents

- ✓ Mont_Brome_titles
- ✓ Prior_considerations_Mont_Brome
- ✓
- ✓ 6.2 QuestionnaireEligibilite_SCMB_OAK(en cours)(signed)
- ✓ 6.5 ENGAGEMENT PRÉLIMINAIRE_Mt_Brome(en cours)(signed)
- ✓ 9.1 Convention_Participation_Pivot_Bromont(en cours)(signed)(en cours)(signed)

- ✓ Date_debut_VCU_SCMB(en cours)(signed)

Public consultation

- ✓ Rencontres_Échanges_SCMB_Ecotierra_Pivot(en cours)(signed)

Risk assessment

- ✓ Annex I Curriculum Vitae
- ✓ Annex II Distance between parthners and Ecotierra
- ✓ Annex III Legal documents
- ✓ Annex IV Political Risk
- ✓ Annex V. Financial Viability
- ✓ Annex VII Sopfeu
- ✓ VCS-Non-Permanence-Risk-Report-Template-Short-Form-v4.0_SMB_LTpf_V4.doc
- ✓ VCS-Risk-Report-Calculation-Tool-v4.0 _SMB_LtPf.xls

SIG

- ✓ Inventory plots location
- ✓ Shp_final_mont_Brome.shp
- ✓ MONT BORMONT LtPF_V3.jpg
- ✓ SMB_2022_LTPF_003.kml