Carbon Credits (Carbon Farming Initiative) (Reforestation and Afforestation) Methodology Determination 2013 [1]

Carbon Credits (Carbon Farming Initiative) Act 2011

I, MARK DREYFUS, Parliamentary Secretary for Climate Change and Energy Efficiency, make this Methodology Determination under subsection 106 (1) of the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

Dated 29 January 2013

MARK DREYFUS

Parliamentary Secretary for Climate Change and Energy Efficiency

Contents

Part 1 Preliminary

1.1 Name of determination

This Determination is the Carbon Credits (Carbon Farming Initiative) (Reforestation and Afforestation) Methodology Determination 2013.

1.2 Commencement

This Determination is taken to have come into force on 1 July 2010.

1.3 Definitions

In this Determination:

abatement potential—see section 2.3.

Act means the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

actual location coordinates means spatial coordinates that are collected on the ground using a global positioning system, and which define the location of plots, biomass sample plots and biomass sample trees.

actual plot size means the area of a plot as physically measured on the ground.

allometric data range means the range between the smallest and largest predictor measures included within an allometric dataset.

allometric dataset means predictor measures and biomass measurements recorded from biomass sample trees which are used to develop an allometric function.

allometric domain means the specific conditions under which an allometric function is applicable.

allometric function means a species-specific regression function fitted to a scatter of data-points that relate predictor measures collected through a non-destructive measurement process to a measure of the weight of biomass within a project tree, and includes stratum specific and regional functions.

allometric report means a document that describes a project proponent's approach to the development of allometric functions, including descriptions of allometric data, allometric domain, regression fitting processes and outcomes of checks against regression fit requirements.

applicability conditions means the conditions that are specified in Part 2 and that must be met in order for this Determination to be applied.

belt plantings means discrete patches of project trees that have been established in a linear or curvilinear 'belt' pattern where width measured across the belt is no wider than 50 metres.

biomass means dry, vegetation-derived organic matter.

biomass components means sections of trees that are divided on the basis of structure or form or both.

biomass sample plot means an area of land that occurs within a biomass sample site and is delineated in accordance with Part 5.

biomass sample site means an area of land from which biomass sample plots are randomly located and biomass sample trees are randomly selected, for the purposes of developing a regional function.

biomass sample tree means a tree selected for destructive sampling in order to develop an allometric function.

branches means the hard, woody above-ground support elements of a tree that are connected to the stem, support the crown, and have a distinct, thick bark layer.

bulked sample means a sample of litter collected through combining 4 smaller samples into a single sample.

carbon dioxide equivalent means carbon dioxide mass equivalent, calculated by multiplying the mass of elemental carbon by $\frac{44}{12}$.

carbon fraction means the proportion, by weight, of dry organic matter that is composed of carbon.

carbon stocks means the quantity of carbon, expressed as carbon dioxide equivalent, held within project forest biomass.

closing carbon stocks means the amount of carbon, expressed as carbon dioxide equivalent, estimated to be held within the project forest biomass occurring within a stratum at the end of a reporting period.

Commencement means the point in time at which preparation of a stratum for planting begins.

crown means non-woody, above-ground tree structures that include twigs, petioles, and leaves, and that are involved in photosynthesis or supporting photosynthetic structures.

crown cover means the amount of land covered by the outer limits of the crown (viewed as a horizontal cross-section) of a tree, or collection of trees.

dead standing tree means a dead tree that shows no signs of having been affected by fire and which remains in an upright, vertical position.

dead standing fire affected tree means a dead tree that shows obvious signs of having been affected by fire and that remains in an upright, vertical position.

disturbance affected stratum means a stratum that has been subject to a growth disturbance event, other than fire—see section 3.5.

establishment phase means a period of land- and project-forest management that is applied to a stratum from 6 months before the planting start date through to 3 years following the planting finish date.

extant project forest means the area of land defined by a project proponent as being occupied by project trees at a specified point in time or during a specified reporting period.

fallen dead wood means dead woody stem and branch components that:

(a) have a cross-sectional diameter of more than 2.5 centimetres;

(b) are derived from a project tree; and

(c) occur at ground level.

fire affected stratum means an area of project forest that has experienced a fire event and that has been dealt with in accordance with section 3.5.

fire emissions means emissions of methane (CH_4) or nitrous oxide (N_2O) arising from fire events.

fire event means an occurrence of a fire in a stratum or strata.

forest means land of a minimum area of 0.2 of a hectare on which trees:

(a) have attained, or have the potential to attain, a crown cover of at least 20% across the area of land; and

(b) have reached, or have the potential to reach, a height of at least 2 metres.

forest cover—land has ***forest cover*** if:

(a) the land has an area of at least 0.2 of a hectare; and

(b) the vegetation on the land includes trees that:

(i) are 2 metres or more in height; and

(ii) provide crown cover of at least 20% of the land.

fuel emissions means emissions of carbon dioxide (CO_2), nitrous oxide (N_2O), or methane (CH_4) arising from fossil fuel use in relation to the delivery of project activities within the project area.

full inventory means an estimation of carbon stocks conducted in accordance with section 5.2.

Note This is one of the 2 measurement processes available to a project proponent to estimate carbon stocks within a stratum and involves the use of temporary sample plots and, optionally, permanent sample plots to estimate carbon stocks. The other process is PSP assessment.

growth disturbance—see section 3.5.

intended location coordinates means spatial coordinates for a randomly selected intersection from a grid overlay used to define the proposed on-ground location of plots and biomass sample plots.

initial carbon stocks means the amount of carbon, expressed in tonnes of carbon dioxide equivalent, estimated to have been contained within the project forest biomass occurring within a stratum as at 1 July 2010.

lateral root means the woody material that extends laterally from a tree's tap root or lignotuber, or both, and that forms part of a tree's below-ground structure.

litter means dead, project-tree derived material which occurs at ground level and is less than 2.5 centimetres in diameter, and can include fallen leaves, twigs, bark and small woody stems in various stages of decomposition.

live fire affected tree means a tree that is living and showing obvious signs of having experienced a fire event, or for which historic records indicate that it has experienced a fire event.

live tree means a tree that is living, which shows no obvious physical signs of having experienced a fire event, and for which no records exist that indicate that it has been affected by a fire event.

maintenance phase means a phase of management activity in relation to a stratum, in which the cumulative carbon sequestration for the stratum is assumed to have plateaued.

management phase means a phase of project tree growth and management activity in relation to a stratum, running from the end of the establishment phase to the start of the maintenance phase.

non-project forest means forest that was not established as a direct result of a project carried out under this Determination.

non-project tree means a tree that was neither planted, nor otherwise established, as a direct result of a project carried out under this Determination.

ortho-rectified aerial imagery means an aerial photograph or satellite image geometrically corrected for distortion to produce a uniform scale across the image.

permanent sample plot (PSP) means a defined area of land that is delineated in accordance with Part 5 and from within which various measurements are taken in order to estimate carbon stocks in a PSP assessment.

planting means the planting of seedlings or the sowing of seed derived from trees.

planting finish date means the date that planting activities were completed within a stratum, being the date at which the last seedling was planted or the date that the last seed was sown.

planting start date means the date that planting activities commenced within a stratum, being the date at which the first seedling was planted or the date that the first seed was sown.

plot means a defined area of land within the project area and can be a temporary sample plot or a permanent sample plot.

predictor measure means a measure of tree dimensions collected through a non-destructive measurement process and referenced in an allometric function to estimate the biomass contained within trees.

prescribed burn means the controlled application of fire within a stratum to assist in the removal or suppression of ground-level vegetation or fire fuel loads.

prescribed weed means any plant that is required by law to be removed.

probable limit of error means the percentage error at the 90% confidence level.

project activity means an activity carried out within the project area as part of the establishment and management of project forest.

project emissions means emissions of greenhouse gases occurring within the project area as a result of a project activity, and from sources identified for inclusion in the project greenhouse gas assessment boundary.

project forest means forest that has been established within the project area as a direct result of a project carried out in accordance with this Determination.

project forest biomass means the biomass contained within project trees, litter, or fallen dead wood.

project removals means removals of greenhouse gases from the atmosphere caused as a result of the project activities.

project tree means a tree that has been established within a stratum through undertaking project activities.

pseudo random number generator means computer software used for generating a sequence of numbers that approximates the properties of random numbers.

PSP—acronym for permanent sample plot.

PSP assessment means an estimation of carbon in an area made in accordance with Subdivision 5.1.6.

> ***Note*** This is one of the 2 measurement processes available to a project proponent to estimate carbon stocks within a stratum and involves the use of permanent sample plots. The other process is a full inventory.

regional function means an allometric function developed by or for a project proponent and which has an allometric domain that potentially extends across multiple strata.

Regulations means the *Carbon Credits (Carbon Farming Initiative) Regulations 2011*.

sampling plan means a plan that identifies the quantity, intended location coordinates and actual location coordinates of TSPs, PSPs, biomass sample plots, and the quantity and actual location coordinates of biomass sample trees, within a stratum or the geographic limits of an allometric domain—see Subdivision 5.1.3.

seed number means a number input into a pseudo random number generator for the purposes of generating a sequence of numbers that approximates the properties of random numbers.

size class means a class of items that is determined according to size.

starting edge means, for a plot established within a belt planting, the first edge of the plot to be laid out on the ground.

stem means the hard woody structural support element of a tree that forms part of the tree's above-ground structure and includes the trunk and heavier vertical limbs extending into the crown.

stratum means an area in the project area that is determined to have common characteristics in accordance with the requirements of Part 3.

stratum area means the area of land that is occupied by a stratum, expressed in hectares.

stratum identifier means a unique numeric, alpha numeric, or text string that is used by a project proponent to refer to and identify a stratum.

stratum specific function means an allometric function developed by or for a project proponent from an allometric dataset collected exclusively from within a single stratum, to which the stratum specific function is intended to be applied.

tap root or lignotuber means a thickened, rigid and dense woody mass connected directly to a tree's stem at ground level and extending downwards into the regolith, and with lateral roots extending from it.

target plot size means the area of the land that is intended to be included within the boundaries of a plot or biomass sample plot as determined in accordance with Part 5.

temporary sampling plot (TSP) means a defined area of land that is delineated in accordance with Part 5 and from within which various measurements are taken in order to estimate carbon stocks in a full inventory.

test tree means a project tree that has been randomly selected from within a temporary sample plot for biomass measurement as part of the process for validating regional functions or converting stratum specific functions to regional functions.

tree means a perennial plant that has primary supporting structures consisting of secondary xylem.

tree status means one of the following conditions of a tree:

(a) live;

(b) dead standing;

(c) live fire affected; or

(d) dead standing fire affected.

tree type means trees that are of the same species and equivalent tree status, and which have predictor measures that fall within a defined range of values.

weighted residual means the difference between measured and predicted (from a regression equation) tree biomass multiplied by a weighting factor, and as calculated using Equation 32b.

Note Other words and expressions used in this Determination have the meaning given by the Act, including:

baseline

carbon dioxide equivalence

crediting period

eligible offsets project

emission

methodology determination

native forest

natural disturbance

offsets project

offsets report

project

project area

project proponent

Regulator; and

reporting period.

1.4 Type of project to which this Determination applies

Note See paragraph 106(1)(a) of the Act.

This Determination applies to a project if:

(a) at least some of the land occurring within the project area before Commencement:

(i) was non-forested land; or

(ii) had forest cover which was removed, or largely removed, by human activity; and

(b) it is intended to generate Australian carbon credit units by:

(i) establishing project forest by planting into land meeting the requirements specified in paragraph (a); and

(ii) maintaining the project forest so as to achieve and maintain project forest cover over time.

Part 2 Requirements for declaration as eligible project

Note See paragraphs 27(4)(c) and 106(1)(b) of the Act.

2.1 Eligible projects

To be declared an eligible offsets project, a project to which this Determination applies must meet the requirements in this Part.

Note In addition, a project must meet the requirements in section 27 of the Act and in the Regulations, including a requirement that the project may not be an excluded offsets project (see regulations 3.36 and 3.37). Regulation 3.1 also includes a requirement to provide, in an application for a declaration of an eligible offsets project, a geospatial map of the project area that meets the requirements of the Carbon Farming Initiative Mapping Guidelines, published by the Department of Climate Change and Energy Efficiency and available at www.climatechange.gov.au.

2.2 Project mechanisms

The project must aim to generate Australian carbon credit units by:

(a) establishing project forest by planting into land meeting the requirements specified in paragraph 1.4(a); and

(b) maintaining the project forest so as to achieve and maintain project forest cover over time.

2.3 Land with abatement potential

(1) For at least 5 years before the project commences, the project area must have included land with the following characteristics:

(a) used for grazing or cropping; or

(b) fallow between grazing or cropping activities;

(c) or a combination of (a) and (b).

(2) If project trees are established by planting on the land specified in subsection (1), they will have the potential to attain:

(a) a height of 2 metres or more; and

(b) a crown cover of at least 20% over the total area of the stratum in which the project trees are located.

2.4 Identification of project area

The project proponent must delineate the boundaries of the project area in accordance with Part 3.

Part 3 Delineating boundaries

3.1 Delineation of project area

(1) The proponent must delineate land included within the project area through applying one, or a combination, of the following processes:

(a) set the geographic limits of the land to be included within the project area as the limits of land title boundaries;

(b) set the geographic limits of the land to be included within the project area as being less than the geographic limits of the land title boundaries and greater than or equal to the geographic limits of strata, either established or intended to be established.

(2) The limits of the project area must be recorded using a geographic information system to generate spatial data-files to identify project area boundaries.

(3) The information specified in subsection (2) must be used to produce hard and soft copy maps to show the boundaries of the project area.

3.2 Delineating stratum boundaries

(1) A project proponent must delineate the boundaries of strata included within the project area by generating a set of spatial coordinates that define the geographic limits of the land area included within each stratum by:

(a) using one of the following methods, or a combination of them, to identify the limits of extant project forest area:

(i) conducting an on-ground survey using a differential global positioning system with sub-1 metre relative accuracy;

(ii) using ortho-rectified aerial imagery; and

(b) using a geographic information system to generate spatial data-files to identify the limits of extant project forest area, stratum buffer and stratum boundaries; and

(c) using the information specified in paragraph (b) to produce hard and soft copy maps to show stratum boundaries.

Use of ortho-rectified aerial imagery

(2) If ortho-rectified aerial imagery is used:

(a) the relevant land area must be digitised from the imagery; and

(b) the imagery must be accurate to within 1 metre; and

(c) the pixel resolution must be no greater than 40 centimetres; and

(d) the image must be of sufficient quality and resolution to allow the clear identification of the limits of project forest establishment activities.

(3) The boundary of the extant project forest area of a stratum is the polygon that is the outer limit of the stems of the project trees that are included in the stratum.

Stratum buffer

(4) The stratum buffer of a stratum consists of land that lies within a crown radius of the extant project forest area of the stratum, other than:

(a) land that lies outside the project area;

(b) land that lies in the extant project forest area of another stratum;

(c) land that is non-project forest.

(5) If application of the stratum buffer would result in the mapped geographic limits of the stratum:

(a) overlapping the geographic limits of a second stratum—then the boundary of the stratum buffer must be equidistant between the two strata along the length of the area where the overlap would otherwise have occurred; or

(b) exceeding the geographic limits of the project area—then the boundary of the stratum buffer must be the limits of the project area.

(6) For the purposes of calculating the stratum area, the boundary of the stratum buffer delineates the boundary of the stratum.

Definitions

(7) In this section:

crown radius, for a stratum, means:

(a) if an average expected radius of a fully mature project tree in the stratum can be estimated appropriately—that radius; or

(b) otherwise—2 metres.

3.3 Division of project area into strata

(1) Before the submission of the first offsets report, the project proponent must define in the project area one or more strata that comply with section 3.4.

(2) The project proponent may define new strata that comply with section 3.4 at any time.

(3) New strata may be excised from existing strata, may replace existing strata or may cover land within the project area not previously included within stratum boundaries.

(4) The boundaries of a stratum must be recorded in accordance with section 3.2, together with the stratum area for the stratum.

(5) The boundaries of a stratum may be redefined, subject to the requirements at section 3.6.

(6) If the boundaries of a stratum are varied, the new boundaries and the new area must be recorded.

3.4 Requirements for a stratum

(1) A stratum is made up of an extant project forest area and a stratum buffer.

(2) The extant project forest area of a stratum:

(a) must be land with abatement potential; and

(b) must have been planted with one or more species of project trees over a period of no more than 120 days.

Note Project proponents may further define strata based on any of the following:

– tree species;
– observed or measured growth trends;
– growing regions;
– climatic conditions;
– soil types;
– disturbance history;
– land management units;
– management regime; or
– any other characteristics that may be likely to influence project tree growth.

3.5 Growth disturbances and revision of strata

(1) This section applies if an event occurs that is likely to affect significantly the project tree growth characteristics of the whole or part of a stratum that has been previously referenced in an offsets report (a ***growth disturbance***).

Note Examples include floods, fires, droughts, pest attacks, diseases and natural disturbances prescribed by the Regulations.

(2) The project proponent must, within 6 months after the growth disturbance, delineate the boundaries of the land occupied by project trees affected by the disturbance.

Note Section 81 of the Act requires a project proponent to notify the Regulator in the event of certain natural disturbances.

(3) If the growth disturbance affects an area of more than 10 hectares in a stratum, the project proponent must, before submitting the offsets report that relates to the time when the growth disturbance occurred, revise the affected stratum in accordance with this section.

(4) If the growth disturbance affects an area of 10 hectares or less in a stratum, the project proponent may, before submitting the offsets report that relates to the time when the growth disturbance occurred:

(a) define a new stratum to include the growth disturbance affected area in accordance with this section; or

(b) continue to treat the growth disturbance affected area as belonging to a single stratum.

Revision of stratum affected by growth disturbance

(5) Subject to subsections 3.6(4) and 3.6(5), if the whole of the stratum is affected by the growth disturbance, the stratum is revised by creating a new stratum identifier and labelling the newly created stratum:

(a) if the disturbance is fire—a ***fire affected stratum***; or

(b) otherwise—a ***disturbance affected stratum***.

(6) If part only of the stratum is affected by the growth disturbance, the stratum is revised by excising that portion of the stratum affected by the growth disturbance and defining this area as a separate stratum which:

(a) complies with section 3.4; and

(b) is labelled:

(i) if the disturbance was fire—a ***fire affected stratum***; or

(ii) otherwise—a ***disturbance affected stratum***.

Requirements for disturbance affected stratum

(7) If a disturbance affected stratum is created, then for the purposes of calculating carbon stock changes and standard error for carbon stock change in accordance with Equations 3a and 3c, the initial carbon stocks and the standard error for initial carbon stocks must be assumed to be zero for the disturbance affected stratum.

Requirements for fire affected stratum

(8) If a fire affected stratum is created:

(a) a full inventory must be conducted in both the fire affected stratum and the stratum from which the fire affected stratum was excised, within 12 months after the fire event;

(b) an estimate of the fire emissions from any fire affected stratum, and the standard error associated with this estimate, must be calculated in accordance with Equations 26a to 27d; and

(c) for the purposes of calculating carbon stock changes and standard error for carbon stock change in accordance with Equations 3a and 3c, the carbon stocks and the standard error for initial carbon stocks must be assumed to be zero for the fire affected stratum.

3.6 Requirements for revisions of strata boundaries

(1) Subject to subsection (3), where a stratum or a stratum boundary is redefined, revised boundaries must comply with section 3.2.

(2) Subject to subsection (3), if a revision, or cumulative revisions, of the boundaries of a stratum change the stratum area by more than 5% between any reporting periods, the following apply:

(a) a full inventory must be conducted in accordance with Subdivision 5.1.2 within the revised stratum no earlier than six months before the first offsets report to reference the revised stratum area;

(b) if a PSP assessment is intended to be referenced from within the stratum in a future offsets report, PSPs must be established across the revised stratum using the process specified in Subdivision 5.1.6.

(3) Where a stratum area is reduced to zero through redefining stratum boundaries in accordance with section 3.3 or 3.5, subsections (1) and (2) do not apply.

(4) Once a stratum is defined within a project area and reported within an offsets report, the stratum identifier associated with that stratum must continue to be reported in subsequent offsets reports as having been associated with the project area even where:

(a) the stratum area is reduced to zero through redefining the stratum boundary; or

(b) the stratum is redefined so that it is entirely replaced with other strata.

(5) Where subsection (4) applies:

(a) values of zero must be recorded against the stratum identifier for the closing carbon stocks and standard error for closing carbon stocks; and

(b) these zero values must be applied for the purposes of calculating the carbon stock change for a stratum and standard error for carbon stock change for a stratum in accordance with section 6.11.

Note A project proponent must generate and keep records in relation to each stratum in accordance with the requirements set out in section 7.21.

Part 4 Operation of the project

Note See paragraphs 27(4)(c), 35(2)(a) and 106(1)(b) of the Act and regulations 1.12 and 3.26 of the Regulations.

4.1 Removal of trees

Non-project trees

(1) Subject to this section, native forest and non-project trees must not be removed from the project area, or otherwise disturbed, for the purposes of undertaking the project.

(2) Non-project trees may be removed from the project area, or otherwise disturbed, only in the following circumstances:

(a) if the non-project trees are prescribed weeds, they can be removed at any time during the life of the project; or

(b) if removal of the non-project trees is otherwise required by law, they can be removed as required under the relevant law; or

(c) if, at the time of Commencement, non-project trees subject to removal:

(i) cover a total land area that represents less than 5% of the project area, as measured by crown cover;

(ii) do not meet the definition of native forest; and

(iii) are less than 2 metres in height;

then:

(iv) they can be removed from within the stratum at any time from Commencement to six months after planting.

Project trees

(3) Project trees may be removed from the project area only in the following circumstances:

(a) for biomass sampling;

(b) to manage a natural disturbance event such as disease or fire; or

(c) where otherwise required or authorised by law.

4.2 Prescribed burns

(1) Subject to section 4.1, one prescribed burn may be applied to each stratum at Commencement or between Commencement and planting.

(2) Subsequent prescribed burns may be conducted only if required or authorised by law.

4.3 Restrictions relating to fertiliser use

Fertiliser may be applied to each stratum no more than 4 times in a 100-year period.

Part 5 Methods for estimating net project abatement

Division 5.1 Estimating project removals

Subdivision 5.1.1 General

5.1 General

This Division sets out processes that must be conducted when undertaking activities in relation to estimating the carbon dioxide equivalent net abatement amount for an eligible offsets project to which this Determination applies.

Subdivision 5.1.2 Conducting a full inventory

5.2 Conducting a full inventory

(1) A requirement under this Determination to conduct a ***full inventory*** is a requirement to conduct an inventory in accordance with this section.

(2) The most recent map of the stratum and the most recent stratum area estimate generated in accordance with Part 3 must be used to conduct a full inventory.

(3) A sampling plan that has been developed in accordance with Subdivision 5.1.3 must be documented.

(4) TSPs must be established and assessed during the full inventory in accordance with Subdivisions 5.1.4 and 5.1.5.

(5) If the project proponent intends to conduct PSP assessment in the stratum and:

(a) PSPs have not been established within the stratum as part of a previous full inventory; or

(b) the number of PSPs previously established in the stratum does not allow the proponent to achieve the target probable limit of error specified in Subdivision 5.1.6;

then PSPs must be established and assessed in accordance with Subdivisions 5.1.4, 5.1.5 and 5.1.6.

(6) Subject to subsection (9), the project proponent must apply at least one of the following classes of allometric function to estimate the biomass in project trees occurring in each plot within the stratum:

(a) a stratum specific function; or

(b) a regional function.

(7) If the project proponent chooses to apply a stratum specific function to estimate the biomass in project trees occurring in each plot within the stratum:

(a) an existing stratum specific function developed in accordance with section 5.31 may be applied; or

(b) a new stratum specific function may be developed in accordance with section 5.31; or

(c) an existing stratum specific function may be updated in accordance with section 5.32.

(8) If the project proponent chooses to apply a regional function to estimate the biomass in project trees occurring in each plot within the stratum, the function must have been developed in accordance with section 5.33 or section 5.34 and validated in accordance with section 5.42.

(9) If an allometric function that meets the requirements of Subdivision 5.1.8 is not available to the project proponent for project trees of a particular species, tree status or size, then all occurrences of that tree type within plots must be noted and recorded as having zero biomass for the purposes of conversion to estimates of carbon stocks in accordance with subsection (11).

(10) If the project proponent chooses to account for carbon in the litter and fallen dead wood pools, the biomass within these pools must be assessed for each plot in the stratum in accordance with sections 5.44 and 5.45.

(11) The biomass estimates specified in subsections (6), (9) and (10) must be converted to estimates of carbon stocks within each plot by using Equations 12 to 22.

(12) The mean plot carbon stocks for a stratum must be calculated using Equation 11a.

(13) The closing carbon stocks for a stratum must be calculated using Equation 5a.

Subdivision 5.1.3 Sampling plans

5.3 Developing and documenting a sampling plan

(1) A sampling plan must be developed when one or more of the following occurs:

(a) a full inventory is conducted;

(b) the establishment of PSPs specified in subsection 5.2(5) or the PSP assessment specified in Subdivision 5.1.6 is conducted;

(c) an allometric function is developed, updated, or validated in accordance with Subdivisions 5.1.8 to 5.1.12.

(2) A project proponent must undertake the processes set out in this section when developing a sampling plan.

(3) A sampling plan must include:

(a) a description of the activity specified in subsection (1) to which the sampling plan relates;

(b) the dates during which the activity was or is to be conducted; and

(c) the information specified in this Subdivision.

5.4 Sampling plan information for full inventory and PSP assessment

(1) This section applies if a sampling plan is developed as part of a full inventory or PSP assessment.

(2) The sampling plan must include:

(a) a description of the stratum to which the sampling plan refers, including a reference to the stratum identifier;

(b) hard- and soft-copy maps showing the geographic boundaries of the stratum;

(c) the target plot size to be applied within the stratum as determined in accordance with Subdivision 5.1.5;

(d) outcomes from the following processes conducted to determine plot establishment rates and the probable limit of error specified in Subdivision 5.1.5 or 5.1.6:

(i) the *ex ante* estimate of the number of plots required to achieve a target probable limit of error for each time the estimate was calculated; and

(ii) the *ex post* analyses testing whether the target probable limit of error has been achieved for each time the analysis was calculated; and

(iii) the *ex post* analysis confirming the target probable limit of error has been achieved.

(e) details of the selection process for plot locations, including seed numbers referenced by the pseudo random number generator when generating a grid overlay and randomly selecting grid intersections as intended location coordinates of plots, as specified in section 5.7;

(f) the number of grid intersections that occur wholly within the stratum boundary as specified in section 5.7;

(g) maps showing the position of:

(i) the grid overlay applied to the stratum as specified in section 5.7;

(ii) the randomly selected grid intersections defining the intended location coordinates of plots as specified in section 5.7;

(iii) the location of plots as established by actual location coordinates.

(h) the intended location coordinates specified in subparagraph (2)(g)(ii) and the actual location coordinates of plots specified in subparagraph (2)(g)(iii);

(i) details of any variation between the spatial coordinates specified in paragraph (h); and

(j) if the variation specified in paragraph (i) exceeds the thresholds specified in section 5.14, details of the corrective measures that were taken.

5.5 Sampling plan information for stratum specific functions

A sampling plan that is developed when a stratum specific function is developed, updated, or validated in accordance with Subdivisions 5.1.8 to 5.1.12 must include the following information:

(a) a description of the stratum to which the sampling plan refers, including a reference to the stratum identifier;

(b) hard- and soft-copy maps showing the geographic boundaries of the stratum;

(c) details of the selection process for biomass sample trees, including:

(i) size classes;

(ii) the number of project trees within each size class; and

(iii) seed numbers referenced by the pseudo random number generator when randomly selecting biomass sample trees;

(d) maps showing the position of TSPs from which biomass sample trees have been selected; and

(e) actual location coordinates for biomass sample trees.

5.6 Sampling plan information for regional functions

A sampling plan that is prepared when a regional function is developed in accordance with Subdivisions 5.1.8 to 5.1.12 must include the following information:

(a) a description of the intended allometric domain to be sampled;

(b) details of the selection process for biomass sample plots, including seed numbers referenced by the pseudo random number generator when undertaking processes such as:

(i) generating a grid overlay;

(ii) selecting grid intersections as intended location coordinates for biomass sample plots;

(c) the number of grid intersections that occur wholly within the biomass sites;

(d) details of the selection process for biomass sample trees, including:

(i) size classes;

(ii) number of trees within each size class; and

(iii) seed numbers referenced by the pseudo random number generator when selecting biomass sample trees.

(e) hard- and soft-copy maps showing:

(i) the location and extent of biomass sample sites;

(ii) the location of biomass sample plots as established by actual location coordinates and as sampled in accordance with section 5.33;

(iii) the grid overlay applied to the biomass sample sites; and

(iv) the randomly selected grid intersections defining the intended location coordinates of biomass sample plots;

(f) the intended location coordinates and actual location coordinates of biomass sample plots;

(g) the actual location coordinates of biomass sample trees; and

(h) target and actual plot sizes for each biomass sample plot.

Subdivision 5.1.4 Location of plots

5.7 Determining the location of plots

(1) A project proponent must determine the location of a plot within a stratum in accordance with this section.

(2) In order to define the intended location coordinates for plots, a geographic information system must be applied to:

(a) establish a grid overlay on a recent map of the stratum boundary developed in accordance with Part 3; and

(b) specify selected points of intersection from the grid overlay specified in paragraph (a).

(3) The process specified in paragraph (2)(a) must meet the following requirements:

(a) the grid must be composed of square cells;

(b) the grid size must be sufficiently small so that the target probable limit of error specified in Subdivision 5.1.5 can be achieved in the event that all points of intersection are selected as intended location coordinates for plots in accordance with subsection (5);

(c) the grid must be located with grid lines running:

(i) north to south (***vertical grid lines***); and

(ii) east to west;

(d) following the process specified in paragraph (c), the grid must be realigned according to a randomly selected angle in accordance with paragraph (e);

(e) the following process must be used to realign the grid:

(i) a software-based pseudo random number generator must be used to generate a random angle value between 0 and 89 degrees; and

(ii) the grid orientation must then be rotated clockwise around the point of grid intersection so that the vertical grid lines align with the randomly generated angle value referred to in subparagraph (i);

(f) when grid size and grid orientation are established as specified in paragraphs (b) and (e), one grid intersection must be aligned over an anchor point as specified in paragraph (g); and

(g) the anchor point referred to in paragraph (f) must be spatially projected using the 'Lamberts' conformal conic projection referencing the GDA94 datum and is defined as having coordinates of X = 1,277,100m, Y = -3,762,300m.

(4) The number of grid intersections that occur within the stratum must be recorded in a sampling plan in accordance with Subdivision 5.1.3.

(5) If the number of recorded grid intersections is equivalent to the number of plots to be established in the stratum as calculated in accordance with Equation 29b, plots are to be located on the ground according to the location of each grid intersection within the stratum.

(6) If the number of recorded grid intersections exceeds the number of plots to be established within the stratum as calculated in accordance with Equation 29b, the following process must be conducted:

(a) each grid intersection is to be numbered consecutively from 1 to i, where i is the total number of intersections occurring within the stratum;

(b) in relation to the number of plots intended to be established within the stratum (n), a software-based pseudo random number generator is to be used to generate a set of n random integers that are randomly selected from within the range 1 to i i ; and

(c) the spatial coordinates of the grid intersections that correspond with the random integers generated in accordance with paragraph (b) are to be recorded in a sampling plan as specified in Subdivision 5.1.3 and applied as the intended location coordinates for plots.

(7) If a pseudo random number generator is applied as part of the process specified in this section, any seed number applied for the purposes of paragraph (6)(b) must be documented in a sampling plan and all associated electronic files must be retained on record in accordance with section 7.25.

(8) The intended location coordinates selected in accordance with the process specified in this section must be recorded in a sampling plan and uploaded into a global positioning system that is to be used to navigate on the ground to the intended location coordinates when establishing plots in accordance with section 5.10.

(9) Subject to subsection (10), the project proponent must apply no more than one of the following layout options across the stratum for the treatment of the on-ground positioning of plots in relation to intended location coordinates:

Centroid option

(a) a plot is established so that the intended location coordinates are located at the centre of the plot;

Consistent edge option

(b) a plot is established so that:

(i) the starting edge passes through the intended location coordinates and is aligned perpendicular to the orientation of the edges of the belt planting;

(ii) if a belt planting has:

(A) an east-west orientation, the plot is laid out toward the most westerly end of the belt planting; or

(B) an orientation other than east-west, the plot is laid out toward the most southerly end of the belt planting; and

(iii) the plot extends across the full width of the belt planting.

(10) A project proponent may apply the consistent edge layout option specified in paragraph (9)(b) only if the stratum in which it is located is exclusively comprised of belt plantings.

Note Subdivision 5.1.7 specifies the treatment of grid intersections and plot locations that fall close to stratum boundaries.

Subdivision 5.1.5 Establishing and assessing plots

5.8 Establishing and assessing plots during full inventory

A project proponent must undertake the processes specified in this Subdivision when establishing and assessing plots during a full inventory.

5.9 Target probable limit of error – full inventory

Plots must be established within a stratum at a rate that achieves a target probable limit of error of no more than 10% at the 90% confidence level around the estimated mean carbon stocks for plots within the stratum calculated using Equation 28.

5.10 Establishing plots

(1) At least 5 plots must be established per stratum.

(2) Subject to paragraphs 5.2(5)(a) and 5.2(5)(b), if a project proponent chooses to conduct PSP assessments in the stratum in accordance with Subdivision 5.1.6, the following requirements must be met:

(a) PSPs must be established within the stratum during full inventory at a rate that achieves a target probable limit of error of no more than 20% at the 90% confidence level around the estimated mean PSP carbon stocks for PSPs within the stratum, as calculated using Equation 28;

(b) a minimum sampling rate of one PSP per 50 hectares of land within the stratum must be achieved; and

(c) at least 5 PSPs must be established within the stratum.

(3) PSPs may be used in combination with TSPs to meet the requirements in subsection (1) and section 5.9.

(4) To assess whether the number of plots intended for establishment within a stratum is likely to achieve the target probable limit of error specified in paragraph (2)(a) and section 5.9, a project proponent must make an *ex ante* estimate of the number of plots required by applying Equations 29a and 29b to pre-existing data collected from either of the following:

(a) a full inventory or PSP assessment previously conducted in the stratum or in other analogous strata; or

(b) a pilot study conducted within the stratum and in which at least 5 TSPs are established and assessed.

(5) Data from TSPs assessed as part of a pilot study specified in paragraph (4)(b) must be used only for the purposes of Equations 29a and 29b and must not be further included in the calculation of carbon stocks.

(6) The intended location coordinates for all plots must be uploaded into a global positioning system.

(7) Plots must be established according to the intended location coordinates as shown on the global positioning system and without any deliberate on-ground repositioning except in instances where the establishment of a plot at the intended location coordinates would constitute a serious safety risk.

(8) If establishing a plot at the intended location coordinates would constitute a serious safety risk, the project proponent must relocate the plot to the nearest safe point to the intended location coordinates and document this relocation and the rationale for the relocation within a sampling plan in accordance with Subdivision 5.1.3.

(9) If intended location coordinates lie close to stratum boundaries, plots must be established in accordance with Subdivision 5.1.7.

5.11 Plot configuration

(1) Plots may be established in one of the following shapes:

(a) circular; or

(b) rectangular.

(2) Once the plot shape is selected, all plots in the stratum must be of the same shape.

(3) In the case where rectangular plots are established in strata:

(a) which are not composed of belt plantings; and

(b) in which project tree planting follows a consistent pattern;

the project proponent may orientate the direction of the plot sides so that 2 plot sides run approximately parallel to the direction of planting lines.

(4) The plot location must not be deliberately shifted from the intended location coordinate as a result of the process specified in subsection (3).

(5) In the case where strata are composed of belt plantings, the project proponent may apply the consistent edge layout option specified in paragraph 5.7(9)(b).

5.12 Plot size

The following requirements must be met in relation to the size of plots in a stratum:

(a) all plots within the stratum must be established according to a constant target plot size;

(b) the target plot size must be at least 0.02 hectares; and

(c) the difference between the actual plot size and the target plot size must not be greater than 2.5%.

5.13 Identifying and marking plots

(1) Each plot must be given a unique identifier being numeric, alpha-numeric or a text string.

(2) Subject to Subdivision 5.1.7, the following parts of a plot must be marked:

(a) the corners of a rectangular plot;

(b) the centre point of a circular plot.

Note Subdivision 5.1.7 deals with plots that are located close to stratum boundaries.

(3) The plot parts specified in subsection (2) must be marked in a way that allows for the identification of:

(a) a TSP and the project trees included within the TSP for at least 12 months from the completion of a full inventory assessment; and

(b) a PSP and the project trees included within the PSP for at least the first 5 years following the date of the establishment or most recent assessment of the PSP.

(4) The boundary markers for a PSP must be fire and flood resistant to allow for the identification of the PSP if a growth disturbance event occurs within 5 years from the establishment, or most recent assessment, of the PSP.

5.14 Plot visits during full inventory

(1) All plots must be visited during a full inventory.

(2) The actual location coordinates for each plot must be logged on the ground using a global positioning system.

(3) An *ex post* comparison between:

(a) the intended location coordinates generated in accordance with section 5.7; and

(b) the actual location coordinates specified in subsection (2);

must be conducted.

(4) Except where subsection 5.10(8) applies, the variation between the coordinates specified in subsection (3) must be no greater than 10m (the ***location tolerance***).

Note Subsection 5.10(8) requires the project proponent to relocate a plot to the nearest safe point if establishing a plot at the intended location coordinates would constitute a serious safety risk.

(5) Except where subsection 5.10(8) applies, if the difference between the intended location coordinates and the actual location coordinates for a plot is greater than the location tolerance specified in subsection (4), then:

(a) data collected from the plot must not be included in any calculation specified in Part 6;

(b) the plot must be relocated; and

(c) the processes specified in subsections 5.10(6) to 5.10(9) and subsections (2) to (4) of this section must be repeated until the location tolerance specified in subsection (4) of this section is met, at which point data can be collected from the plot for the purposes of application to the calculations specified in Part 6.

Note All *ex post* comparisons including, if applicable, the requirement to relocate plots as specified in paragraph (b), must be documented in a sampling plan in accordance with Subdivision 5.1.3.

5.15 Collection of information during plot visits

(1) The following information must be collected during visits to a plot:

(a) the plot identifier and date of assessment;

(b) the dimensions of the plot;

(c) whether the plot falls wholly within the stratum boundary, or is an edge plot that is partially inclusive of land that falls outside the stratum boundary; and

(d) the following characteristics for each project tree in a plot:

(i) tree status;

(ii) species; and

(iii) predictor measure.

(2) If there are no project trees within the boundaries of a plot, or the plot includes only project trees to which subsection 5.2(9) applies:

(a) the plot must be recorded as having zero carbon stocks; and

(b) the carbon stock values recorded in accordance with paragraph (a) must be included in the following calculations:

(i) Equations 9a, 9b, 11a and 11b; and

(ii) if project trees occurred within the boundaries of the plot at the most recent full inventory to have been referenced in an offsets report, Equation 10.

(3) Non-project trees must not be assessed or included in any carbon stock calculations for the project.

(4) If the project proponent chooses to account for carbon contained in litter and fallen dead wood, the carbon must be assessed in accordance with sections 5.44 and 5.45.

5.16 Ex post analysis of plots

(1) Where full inventory is conducted, a project proponent must calculate the probable limit of error for mean plot carbon stock for a stratum using Equation 28 to determine whether the target probable limit of error specified in section 5.9 has been achieved.

(2) If the target probable limit of error has not been achieved, the project proponent must establish and assess additional plots in accordance with this Subdivision until the target probable limit of error specified in section 5.9 is achieved.

Subdivision 5.1.6 PSP assessments

5.17 Conducting PSP assessments

A project proponent must undertake the processes specified in this Subdivision when conducting a PSP assessment within a stratum.

5.18 General requirements for PSP assessments

(1) Before undertaking the processes specified in this section, PSPs must have been previously established within the stratum as part of a full inventory in accordance with section 5.2 and Subdivision 5.1.5.

(2) A recent map of the stratum and a stratum area estimate for the stratum must be generated in accordance with Part 3.

(3) A sampling plan developed in accordance with Subdivision 5.1.3 must be documented to describe the number and location of PSPs within the stratum.

(4) All PSPs within the stratum must be visited and the processes specified in section 5.15 performed.

(5) The biomass content of project trees assessed within each PSP must be estimated using allometric functions that have been developed and validated in accordance with Subdivisions 5.1.8 to 5.1.12.

(6) Where an allometric function that meets the requirements of Subdivision 5.1.12 is not available to the project proponent for application to a project tree of a particular tree type occurring within a PSP, then that project tree must be noted and recorded as zero biomass for the purposes of conversion to estimates of carbon stocks as specified in subsection (8).

(7) If the project proponent chooses to account for carbon in the litter and fallen dead wood pools, the biomass within these pools for each PSP must be assessed in accordance with sections 5.44 and 5.45.

(8) The biomass estimates specified in subsections (5) to (7) must be converted to estimates of carbon stocks within each plot by using Equations 12b to 18.

5.19 Ex post analysis of PSPs

(1) For the purposes of this Subdivision, the target probable limit of error around the mean of carbon stock values for PSPs occurring within the stratum is to be no greater than 20% at the 90% confidence level.

(2) The project proponent must calculate the probable limit of error for the mean of carbon stock values for PSPs occurring within the stratum using Equation 28 to determine whether the target probable limit of error specified in subsection (1) has been achieved.

(3) If the target probable limit of error specified in subsection (1) is achieved, closing carbon stocks for the stratum are to be calculated using Equation 6a.

(4) If the target probable limit of error specified in subsection (1) is not achieved:

(a) data from the PSP assessment must not be used to calculate the closing carbon stocks for the stratum using Equation 6a; and

(b) the project proponent must:

(i) conduct a full inventory in accordance with section 5.2; and

(ii) if the project proponent intends to conduct further PSP assessments in the stratum, establish and assess PSPs in accordance with Subdivisions 5.1.5 and 5.1.6 for the purposes of achieving the target probable limit of error specified in subsection (1).

Subdivision 5.1.7 Plots located close to stratum boundaries

5.20 Dealing with plots located close to stratum boundaries

(1) This section applies if the intended location coordinates for a plot as determined in accordance with section 5.7 fall close to the boundary of a stratum.

(2) Except where subsection 5.10(8) applies, if the intended location coordinates are within the stratum boundary, a plot must be established and assessed so that the difference between the actual location coordinates and intended location coordinates is no greater than the location tolerance specified in subsection 5.14(4).

Note Subsection 5.10(8) requires the project proponent to relocate a plot to the nearest safe point if establishing a plot at the intended location coordinates would constitute a serious safety risk.

(3) If the intended location coordinates fall outside the stratum boundary, no plot is to be established at that location.

5.21 Edge plots

(1) If part of the boundary of a plot falls outside the stratum boundary, the plot is to be known as an 'edge plot'.

(2) Edge plots can be either circular or rectangular.

(3) Plot markers for rectangular edge plots must be either:

(a) aligned with the limits of the stratum boundary; or

(b) placed at all corners of the plot.

(4) Circular edge plots must be marked in accordance with paragraph 5.13(2)(b).

(5) The plot area for an edge plot is taken to be equivalent to the target plot size as established in accordance with section 5.12.

5.22 Plot carbon stocks

(1) Project trees that occur both within the plot boundary and the stratum boundary must be assessed in accordance with Subdivision 5.1.5.

(2) If the project proponent has elected to assess litter and fallen dead wood within the stratum, then the litter and fallen dead wood that occur both within the plot boundary and the stratum boundary must be assessed in accordance with the specified section:

(a) litter – section 5.44;

(b) fallen dead wood – section 5.45.

(3) Plot carbon stocks must be calculated using Equations 12a to18, where the plot area value (A_p) is equivalent to the target plot size as specified in subsection 5.21(5) and as documented in the sampling plan.

Subdivision 5.1.8 Allometric functions

5.23 Applying species specific allometric functions

(1) A project proponent must undertake the processes specified in this Subdivision when estimating biomass of project trees for a given tree type.

(2) A project proponent may only apply an allometric function where:

(a) the requirements set out in this Subdivision are met; and

(b) the compatibility and validation tests specified in Subdivision 5.1.12 are satisfied.

(3) An allometric function must only be applied to project trees that occur within the allometric domain for that allometric function.

5.24 Allometric domain

(1) For each allometric function applied, the project proponent must clearly define the allometric domain for that function by recording and documenting the following in an allometric report in accordance with section 5.29:

(a) the following information regarding the tree type from which the allometric dataset has been collected:

(i) the species of tree;

(ii) the tree status; and

(iii) the allometric data range;

(b) the predictor measures referenced by the allometric function;

(c) the procedures used to assess the predictor measures; and

(d) subject to subsection (2), the geographic area over which the allometric function is assumed to apply.

(2) For a stratum specific function, the geographic limits of the allometric domain are defined as being the limits of the stratum boundary from which the allometric dataset was collected.

(3) To avoid doubt, an allometric function must not be used if the information requirements specified in subsection (1) cannot be met.

5.25 Regression fitting

(1) A project proponent must undertake the processes specified in this section when conducting regression analyses for the purpose of developing allometric functions.

(2) An allometric function must not be used as part of an offsets project to which this Determination applies unless the function has been derived by using regression analyses to relate predictor measures collected from biomass sample trees to biomass estimates obtained for the same set of biomass sample trees.

Allowable regression forms

(3) In cases where a project proponent uses either a single predictor measure or multiple predictor measures:

(a) data must not be transformed; and

(b) the weighted least squares method must be applied to estimate the line of best fit.

(4) In cases where a single predictor measure is used, linear or non-linear regression techniques may be applied.

(5) In cases where multiple predictor measures are used, multiple linear or non-linear regression techniques may be applied.

(6) An allometric function must take one of the following forms:

(a) $$B_T = a \times \prod_{i=1}^{p} M_i^{b_i}$$

or

(b) $$B_T = a + \sum_{i=1}^{p} (b_i \times M_i)$$

where:

B_T = biomass for a tree in kilograms of dry matter.

M_i = the i^{th} of p predictor measure(s) for estimating biomass within a tree.

a, b_i = constants derived through regression analyses, $i = 1$ to p.

5.26 Minimum data requirements

(1) This section specifies the minimum data requirements for conducting regression analyses for the purpose of deriving an allometric function.

(2) The regression analyses used to develop an allometric function must reference data collected from at least 20 individual biomass sample trees sampled from within the geographic limits of the relevant allometric domain.

(3) Both above-ground and below-ground biomass components of the biomass sample trees specified in subsection (2) must have been sampled in accordance with Subdivision 5.1.10.

(4) An allometric function used as part of an offsets project to which this Determination applies must not assume a below-ground biomass fraction.

5.27 Minimum regression fit requirements

(1) This section specifies the requirements that must be met before an allometric function can be used to estimate biomass from project trees.

(2) In this section:

statistically significant means a two-tailed probability level of <0.05.

(3) An allometric function may be used to estimate biomass within a particular allometric domain only if the allometric function is documented in an allometric report in accordance with section 5.29 and if:

(a) the regression relationship upon which the allometric function is based:

(i) is statistically significant; and

(ii) achieves a coefficient of determination (r^2) no less than 0.75;

(b) the mean of the weighted residuals calculated at Equation 32b is not statistically significant from zero, as determined through applying a student t-test with two-tailed probability level of <0.05; and

(c) weighted residuals are normally distributed around zero.

(4) If the requirements specified in subsection (3) are not met, the project proponent may apply one of the following processes:

(a) redefine the allometric domain *ex post* so that the allometric function meets the requirements of subsection (3);

(b) use multiple regression techniques, with the application of multiple predictor measures so that the allometric function satisfies the requirements of subsection (3); or

(c) undertake the following steps:

(i) conduct further sampling using the processes described at Subdivisions 5.1.9 to 5.1.11;

(ii) combine the data obtained from the further sampling specified in subparagraph (i) with the original dataset; and

(iii) re-perform the regression analyses specified in section 5.25 with reference to the combined allometric dataset specified in subparagraph (ii).

5.28 Variance of weighted residuals

A project proponent must calculate and report the variance of weighted residuals for an allometric function using Equation 32a.

Note The outcome of the calculation referred to in this section is required for the validation process that must be performed in accordance with Subdivision 5.1.12 and to ensure that the fit of the allometric function meets the minimum requirements described at section 5.27.

5.29 Allometric report

The following must be documented in an allometric report for each allometric function applied by a project proponent to project trees in the project:

(a) unique identifier for the allometric function, being numeric, alpha-numeric or a text string;

(b) the allometric domain for the allometric function defined in accordance with section 5.24;

(c) the number of biomass sample trees that were assessed in order to develop the allometric function;

(d) unique numeric, alpha-numeric or text string identifiers for each biomass sample tree;

(e) procedures for collecting predictor measures from the biomass sample trees assessed in order to develop the allometric function;

(f) predictor measures for all biomass sample trees assessed in order to develop the allometric function;

(g) wet-weight for biomass components for all biomass sample trees assessed in order to develop the allometric function;

(h) sub-sample wet and dry weights and wet to dry weight ratios;

(i) estimates of error associated with measuring equipment used to measure wet-weight and dry-weights;

(j) regression plots showing the spread of data points and regression fit;

(k) charts showing the spread and distribution of weighted residuals;

(l) the mathematical form for the allometric function including parameter values;

(m) the outcomes of checks against conditions specified in subsection 5.27(3);

(n) details of any process conducted in accordance with subsection 5.27(4);

(o) if the process specified in paragraph 5.27(4)(a) is undertaken, the following information:

(i) the rationale for refining the allometric domain including any selection of data sub-sets; and

(ii) evidence that data points have not been subjectively removed from the dataset in order to reduce variability; and

(p) the variance of weighted residuals, as calculated in accordance with section 5.28.

Subdivision 5.1.9 Allometric functions for live trees

5.30 Developing allometric functions for live trees

(1) A project proponent must undertake the processes specified in this Subdivision when performing the following actions in relation to allometric functions and live trees:

(a) developing stratum specific functions, in accordance with section 5.31;

(b) updating pre-existing stratum specific functions, in accordance with section 5.32; and

(c) developing regional functions, in accordance with section 5.33.

Note Section 5.39 specifies the processes for developing allometric functions for live fire affected trees, dead standing trees, and dead standing fire affected trees.

(2) The details of all biomass sample site and biomass sample tree selections made in accordance with this Subdivision must be documented in a sampling plan as specified in Subdivision 5.1.3.

5.31 Developing stratum specific functions

(1) Before a project proponent can conduct the processes specified in this section:

(a) a full inventory must have been conducted in accordance with section 5.2 within the stratum for which the stratum specific function is intended to be developed;

(b) TSPs must have been established as part of the full inventory specified in paragraph (a); and

(c) measures of candidate predictor measures must have been collected from all project trees of the tree type intended to be referenced by the stratum specific function that occur within the TSPs specified in paragraph (b).

(2) The project proponent must undertake the processes specified in this section in order to select and assess biomass sample trees from within TSPs.

(3) The project trees specified in paragraph (1)(c) must be ranked according to size based on the predictor measures specified in that paragraph.

(4) The smallest and largest of the project trees specified in paragraph (1)(c) must be selected for assessment as biomass sample trees.

(5) The remaining project trees specified in paragraph (1)(c) must be divided into at least 5 size classes.

(6) Subject to subsections (7) and (8), an equal number of the project trees must be randomly selected from the size classes specified in subsection (5).

(7) A total of at least 20 project trees specified in paragraph (1)(c), including the 2 trees selected in accordance with subsection (4), must be selected for assessment as biomass sample trees.

(8) The following steps must be followed to achieve random selection from within each size class:

(a) the project trees specified in paragraph (1)(c) must be ranked from smallest to largest;

(b) the project trees must be numbered from 1 to *i*, where *i* is the number of project trees within the size class;

(c) a software-based pseudo random number generator must be used to generate a random integer from 1 to *i*;

(d) the project tree which corresponds to the integer generated at paragraph (c) must be selected as a biomass sample tree; and

(e) the steps described at paragraphs (c) and (d) must be repeated until the necessary number of biomass sample trees have been selected for the size class.

(9) Subject to subsection (10), all biomass sample trees selected in accordance with subsections (4) to (8) must be assessed in accordance with Subdivision 5.1.10.

(10) Where assessment of one or more biomass sample trees would constitute a serious risk to safety, cultural heritage, environmental values or property, the project proponent must select other biomass sample trees by applying the random selection process described at subsection (8) and must document this reselection and the rationale for the reselection within a sampling plan in accordance with Subdivision 5.1.3.

(11) A regression function must be fitted and *ex post* analyses performed in accordance with the requirements specified in Subdivision 5.1.8.

5.32 Updating pre-existing stratum specific functions

(1) This section applies where a stratum specific function:

(a) has been developed in accordance with section 5.31; and

(b) is being updated as part of a full inventory.

(2) In this section:

original stratum specific function means the function specified in paragraph (1)(a).

Project tree selection

(3) Subject to subsection (4), a project proponent must undertake the processes specified in section 5.31 when updating an original stratum specific function.

(4) For the purposes of subsection 5.31(7), at least 10 biomass sample trees, including the 2 trees selected at subsection 5.31(4), must be selected.

(5) The data collected from the biomass sample trees in accordance with subsections (3) to (4) must be combined with the allometric dataset used to develop the original stratum specific function.

Updated regression function

(6) The processes specified in sections 5.25, 5.27 and 5.28 must be applied to the allometric dataset that has been combined in accordance with subsection (5).

(7) In the case where the minimum regression fit requirements specified in subsection 5.27(3) are met, the updated stratum specific function may be applied within the stratum from which the allometric dataset was derived without applying the validation process specified in section 5.42.

(8) In the case where the minimum regression fit requirements specified in subsection 5.27(3) are not met, the project proponent may apply section 5.31 to develop a new stratum specific function by combining the dataset collected from the biomass sample trees assessed at subsections (3) to (4) with a minimum of at least a further 10 biomass sample trees assessed in accordance with section 5.31.

5.33 Regional functions

(1) A project proponent must undertake the processes specified in this section when developing a regional function.

(2) The project proponent may develop a regional function from trees that are inside or outside the project area.

Allometric domain

(3) Subject to subsection (4), the allometric domain that relates to the regional function must be defined in accordance with section 5.24.

(4) If a stratum specific function is reclassified as a regional function, the process specified in section 5.34 must be undertaken.

(5) Biomass sample sites that are within the geographic limits of the allometric domain for the assessment of biomass sample trees for the tree type that will be referenced by the regional function must be mapped using a geographic information system.

(6) A minimum of 10 locations must be selected from within the biomass sample sites mapped in accordance with subsection (5) for the establishment of biomass sample plots using the process specified in subsections 5.7(2) to 5.7(8), subject to the following modifications:

(a) references to stratum are to be replaced with references to biomass sample sites;

(b) references to probable limits of error are to be ignored; and

(c) references to PSP, TSP or plot are to be replaced with references to biomass sample plot.

(7) Subject to subsection 5.10(8), biomass sample plots must be established in accordance with subsection 5.10(7) to section 5.12 in each randomly selected location, subject to the following modifications:

(a) references to stratum are to be replaced with references to biomass sample sites;

(b) references to PSP, TSP or plot are to be replaced with references to biomass sample plot;

(c) references to probable limits of error are to be ignored; and

(d) the minimum target plot size is to be 5 square metres.

Note Subsection 5.10(8) requires the project proponent to relocate a plot to the nearest safe point if establishing a plot at the intended location coordinates would constitute a serious safety risk.

(8) The combination of target plot size and the number of biomass sample plots must ensure that at least 100 trees of the tree type to be referenced by the regional function are included within the biomass sample plots.

(9) The following parts of a biomass sample plot must be temporarily marked in order to allow for return visits to the plot within 12 months of assessment:

(a) the corners of a rectangular biomass sample plot;

(b) the centre point of a circular biomass sample plot.

(10) All occurrences of a tree type to be referenced by a regional function in a biomass sample plot must be identified and candidate predictor measures must be collected from each tree.

(11) At least 20 biomass sample trees must be selected in accordance with the process described at subsections 5.31(3) to 5.31(8), subject to the following modifications:

(a) references to TSPs are to be replaced with references to biomass sample plots; and

(b) references to 'project trees specified in paragraph (1)(c)' are to be replaced with references to trees.

(12) Subject to subsection (13), all biomass sample trees selected in accordance with subsection (11) must be assessed using the process specified in Subdivision 5.1.10.

(13) Where assessment of one or more biomass sample trees would constitute a serious risk to safety, cultural heritage, environmental values or property, the project proponent must select other biomass sample trees by applying the random selection process described at subsection 5.31(8) and must document this reselection and the rationale for the reselection within a sampling plan in accordance with Subdivision 5.1.3.

(14) A regression function must be fit and *ex post* analyses performed in accordance with Subdivision 5.1.8.

5.34 Converting a stratum specific function to a regional function

If a stratum specific function is validated in accordance with Subdivision 5.1.12 for a stratum outside the stratum from which the function was developed, then:

(a) the stratum specific function may be reclassified as a regional function; and

(b) the geographic limits of the allometric domain may be redefined so as to include the geographic limits of each stratum for which the stratum specific function has been validated in accordance with Subdivision 5.1.12.

Subdivision 5.1.10 Assessing biomass sample trees

5.35 Assessing above-ground biomass of biomass sample trees

(1) A project proponent must undertake the processes specified in this section when assessing the above-ground biomass of a biomass sample tree.

(2) For each biomass sample tree, measures of candidate predictor measures must be collected.

(3) The biomass sample tree must be cut at ground level and separated into biomass components.

(4) As a minimum, the components specified in subsection (3) must include:

(a) stem;

(b) branches;

(c) crown; and

(d) dead material, including dead branches, dead stem and dead crown, attached to the biomass sample tree.

(5) After completing the process specified in subsection (3), the total wet weight for each of the separated above-ground biomass components must be recorded and documented in an allometric report.

(6) Subject to subsection (13), for each biomass sample tree at least 3 representative sub-samples must be collected from each biomass component and weighed immediately after carrying out the requirement specified in subsection (5).

(7) Subject to subsection (13), the wet-weight of the sub-samples specified in subsection (6) must be recorded and documented in an allometric report as specified in section 5.29.

(8) The following must be oven-dried to constant weight between 70 and 80 degrees Celsius:

(a) the sub-samples specified in subsection (6), or

(b) the biomass component specified in subsection (13).

(9) The following must be recorded and documented in an allometric report as specified in section 5.29:

(a) the dry-weight of the sub-samples that have been oven-dried in accordance with subsection (8); or

(b) the biomass component specified in subsection (13).

(10) The dry-wet weight ratio for each of the sub-samples specified in subsection (6), or the biomass component as specified in subsection (13), must be calculated by dividing dry weight by wet weight.

(11) The average of the dry-wet weight ratios specified in subsection (10) must be calculated.

(12) The dry weight of each above-ground biomass component of the biomass sample tree must be estimated using Equation 31 and applying the average of the dry-wet weight ratios as specified in subsection (11).

(13) As an alternative to the sub-samples specified in subsection (6), the entire biomass component may be used in the processes specified in subsections (7) to (10).

5.36 Assessing root biomass of biomass sample trees

(1) A project proponent must undertake the processes specified in this section when assessing the below-ground biomass of a biomass sample tree.

(2) Subject to subsections (3) and (5), the roots of each individual biomass sample tree must be excavated by defining those parts of the root system that will be included in the sampling and measurement process.

(3) Roots that have a diameter of less than 2 millimetres must not be included in the processes specified in subsections (5) to (14), except where the roots are attached to larger root sections.

(4) A root system must be cleaned so that contamination from soil and any other contaminants is minimised.

(5) Once excavated and cleaned, the root system must be divided into its separate biomass components which must include at least:

(a) the tap root or lignotuber*;* and

(b) the lateral roots.

(6) After completing the processes specified in subsection (5), the total wet weight for each of the separated below-ground biomass components must be recorded and documented in an allometric report as specified in section 5.29.

(7) Subject to subsection (14), for each biomass sample tree at least 3 representative sub-samples must be collected from each biomass component and weighed immediately after carrying out the requirement specified in subsection (6).

(8) Subject to subsection (14), the wet-weight of all sub-samples specified in subsection (7) must be recorded and documented in an allometric report.

(9) The following must be oven-dried to constant weight between 70 and 80 degrees Celsius:

(a) the sub-samples specified in subsection (7); or

(b) the biomass component as specified in subsection (14).

(10) The following must be recorded and documented in an allometric report as specified in section 5.29:

(a) the dry-weight of the sub-samples that have been oven-dried in accordance with subsection (9); or

(b) the dry weight of the biomass component as specified in subsection (14).

(11) The dry-wet weight ratio for each of the sub-samples specified in subsection (7), or the biomass component as specified in subsection (14), must be calculated by dividing dry weight by wet weight.

(12) The average of the dry-wet weight ratios specified in subsection (11) must be calculated.

(13) The dry weight of each below-ground biomass component of the biomass sample tree must be estimated using Equation 31 and applying the average of the dry-wet weight ratios as specified in subsection (12).

(14) As an alternative to the sub-samples specified in subsection (7), the entire biomass component may be used in the processes specified in subsections (8) to (11).

5.37 Assessing biomass of entire biomass sample tree

After completing the processes specified in sections 5.35 and 5.36, the biomass for the entire biomass sample tree must be estimated using Equation 30.

5.38 Record keeping and reporting

A project proponent must retain records:

(a) of all measures collected as part of the processes specified in sections 5.35 to 5.36; and

(b) that demonstrate constant weight is achieved in accordance with subsections 5.35(8) and 5.36(9).

Subdivision 5.1.11 Allometric functions for other trees

5.39 Developing allometric functions for trees other than live trees

(1) If a project proponent chooses to account for carbon stocks in project trees with the following tree status:

(a) dead standing;

(b) dead standing fire affected; and

(c) live fire affected;

the project proponent must develop species-specific allometric functions that relate to these tree types in accordance with Subdivisions 5.1.8 and 5.1.9, subject to the modifications set out in this section.

(2) In the case of dead standing trees and dead standing fire affected trees:

(a) the allometric function must relate the preferred predictor measure to stem biomass only, and not to biomass for the entire tree; and

(b) biomass contained in non-stem components, such as branches, crown and below-ground biomass components, must be assumed to be zero.

(3) In the case of live fire affected trees, the project proponent may:

(a) adopt the stem-only approach specified in subsection (2); or

(b) apply the approach specified in Subdivision 5.1.9 to develop allometric functions based on sampling of entire trees, ensuring that the tree status referred to by the allometric domain is 'live fire affected tree'.

(4) If the project proponent considers that, over time, a set of live fire affected trees has returned to a state that is equivalent to a live tree, the project proponent may revert to using an allometric function developed for live trees in accordance with Subdivision 5.1.9, subject to subsection (5).

(5) The project proponent must use the process specified in Subdivision 5.1.12 to validate the allometric function for the live fire affected trees.

(6) When the allometric function specified in subsection (5) is validated, the live fire affected trees may be reclassified as live trees.

Subdivision 5.1.12 Applicability of allometric functions

5.40 Testing the applicability of allometric functions

A project proponent must undertake the processes specified in this Subdivision when testing the applicability of allometric functions.

5.41 Compatibility checks

If an allometric function is to be applied to a project tree within a stratum, the project proponent must confirm that:

(a) predictor measures collected from the project tree during the full inventory or PSP assessment do not exceed the allometric data range;

(b) the species and status of the project tree assessed during the full inventory or PSP assessment are consistent with the tree type referenced by the allometric function;

(c) the measurement procedures used to collect predictor measures from the project tree during the full inventory or PSP assessment are the same as those used to develop the allometric dataset; and

(d) if a stratum specific function is to be applied, the project tree occurs within the same stratum from which the stratum specific function was developed.

5.42 Validation test

(1) A project proponent must perform the validation test specified in this section at the following times within the stratum to which the allometric function is to be applied:

(a) for a regional function, during the first reporting period that the regional function is to be applied within the stratum;

(b) when a stratum specific function is to be converted to a regional function as specified in section 5.34; and

(c) during the last reporting period for the crediting period.

(2) The validation test performed at the times specified in subsection (1) must be carried out as part of a full inventory conducted within the stratum to which the validation test is to be applied.

(3) Predictor measures must have been collected from all project trees that:

(a) are of the tree type relevant to the allometric function against which the validation test will be applied; and

(b) occur within the TSPs established within the stratum during the full inventory.

(4) The project trees specified in subsection (3) must be ranked according to size.

(5) The smallest and largest of the project trees specified in subsection (3) must be selected for assessment as test trees.

(6) The predictor measures for the remaining project trees specified in subsection (3) must be divided into at least 5 even size classes.

(7) Subject to subsections (8) and (9), an equal number of project trees must be randomly selected as test trees from each size class determined in accordance with subsection (6).

(8) A minimum of 10 test trees, including the 2 trees selected in accordance with subsection (5), must be selected.

(9) Subject to subsections (10) and (11), the steps set out at subsection 5.31(8) must be followed to achieve random selection from within each size class.

(10) If there are exactly 10 project trees of the relevant tree type represented in all TSPs established within the stratum during the full inventory, each project tree may be selected instead of applying the random selection process referred to in subsection (9).

(11) If there are fewer than 10 project trees of the relevant tree type occurring within TSPs established with the stratum during the full inventory, a project proponent must choose one of the following two options:

(a) establish further TSPs in accordance with this Division until the tree type is sufficiently represented to allow the process specified in subsection (9) or (10) to be undertaken; or

(b) assume the carbon stocks for that tree type is zero whenever it is included within a TSP or PSP.

(12) In the case where the option specified in paragraph (11)(b) is selected, no further steps of the validation test set out in this section need to be conducted.

(13) Once selected in accordance with this section, each test tree must be assessed in accordance with Subdivision 5.1.10.

(14) A predicted estimate of the biomass contained within each test tree must be generated using the allometric function to be validated using as inputs the predictor measures collected from the test trees.

(15) Using the measured and predicted biomass estimates generated at subsections (13) and (14), Equations 32a and 32b must be applied to calculate the variance of weighted residuals for the set of test trees.

(16) To test for statistical difference between the variance of weighted residuals calculated for the allometric function in accordance with section 5.28 and the variance of weighted residuals specified in subsection (15) for the set of test trees, an upper one-tailed F-Test must be applied in accordance with subsection (17).

(17) The F-Test specified in subsection (16) must be performed by using Equations 33a and 33b to calculate an F-Test statistic and appropriate degrees of freedom.

(18) If the F-Test statistic is less than the comparison critical F-value specified in subsections (16) and (17), then the allometric function:

(a) is taken to have been validated for application in that stratum; and

(b) may be applied to all project trees of the relevant tree type occurring within the stratum that fall within the allometric domain of the validated allometric function.

(19) If the F-Test statistic is more than the comparison critical F-value specified in subsections (16) and (17), the stratum is considered to fall outside the allometric domain of the allometric function.

(20) In the case where subsection (19) applies, the project proponent may:

(a) seek to validate an alternative existing regional function by undertaking the process specified in this section; or

(b) for the project trees to which the allometric function was intended to be applied, count all occurrences of the relevant tree type in plots in the stratum as having zero carbon stock; or

(c) develop a stratum specific function using the approach specified in section 5.31.

(21) If a project proponent chooses to develop a stratum specific function in accordance with paragraph (20)(c), data collected from the test trees may be included in developing the stratum specific function, provided that at least an additional 10 biomass sample trees are selected in accordance with subsections 5.31(2) to 5.31(8) in order to achieve a minimum of at least 20 biomass sample trees.

5.43 Reporting requirements

The project proponent must document in an offsets report the outcomes of compatibility checks and validation tests performed in accordance with this Subdivision, including any substitution, or development of, stratum specific functions arising as a result of the compatibility checks and validation tests.

Subdivision 5.1.13 Assessing carbon stocks in fallen dead wood and litter

5.44 Assessing carbon stocks in litter

(1) If a project proponent chooses to assess the carbon stocks in litter, the project proponent must undertake the assessment process specified in this section.

Assessment process

(2) For each plot to be assessed, 4 litter samples must be collected in accordance with the following requirements:

(a) a sampling frame must be placed randomly in 4 separate locations within the boundaries of the plot being assessed;

(b) the sampling frame must be either square or rectangular;

(c) the locations of the sampling frame must not overlap;

(d) no litter must be collected from outside the boundaries of the sampling frame; and

(e) dirt and non-litter contaminants are to be minimised within the sample.

(3) The 4 samples specified in subsection (2) must be combined into a single bulked sample for the plot.

(4) The wet weight of the bulked sample specified in subsection (3) must be recorded immediately after performing processes specified in subsections (2) and (3) and documented in an allometric report.

(5) For all plots assessed on each day, or at least the first 3 plots assessed each day, a sub-sample from the bulked sample for each plot must be collected and the wet weight of each sub-sample is to be recorded and documented in an allometric report.

(6) The sub-samples specified in subsection (5) must be oven-dried to constant weight between 70 and 80 degrees Celsius.

(7) The weight of the sub-samples that have been dried in accordance with subsection (6) must be recorded and documented in an allometric report.

(8) The dry-to-wet weight ratio of the sub-samples collected each day must be calculated by dividing the dry weight for each sub-sample by its wet weight.

(9) When the dry-to-wet weight ratio of each sub-sample has been calculated in accordance with subsection (8), the average of the ratios must be calculated.

(10) The average dry-to-wet weight ratio calculated in accordance with subsection (9) must be used to estimate the dry weight of the bulked samples collected on that day.

(11) The carbon stocks contained in litter located in the TSP or PSP must be calculated using Equation 17.

5.45 Assessing carbon stocks in fallen dead wood

(1) If a project proponent chooses to assess the carbon stocks in fallen dead wood, the assessment process specified in this section must be undertaken.

Assessment process

(2) For each plot to be assessed, fallen dead wood in the plot must be collected.

(3) In the case where a piece of fallen dead wood in the plot extends beyond the boundaries of the plot, a project proponent may:

(a) cut the piece of fallen dead wood so that only the proportion occurring within the plot is collected; or

(b) exclude that piece of fallen dead wood from the assessment.

(4) The wet weight of the fallen dead wood that has been collected must be recorded and documented in an allometric report.

(5) For all plots assessed on each day, or at least the first 3 plots assessed on each day, a sub-sample from the fallen dead wood must be collected by taking at least 3 cross-sectional discs from randomly selected pieces of the fallen dead wood.

(6) The wet weight of each sub-sample collected in accordance with subsection (5) must be recorded immediately after collection and documented in an allometric report.

(7) The remainder of the fallen dead wood must be scattered uniformly over the plot.

(8) The sub-samples specified in subsection (5) must be oven-dried to constant weight between 70 and 80 degrees Celsius.

(9) The dry weight of the sub-samples oven-dried in accordance with subsection (8) must be recorded and documented in an allometric report.

(10) The dry-to-wet weight ratio of each sub-sample must be calculated by dividing the dry weight for a sub-sample by its wet weight.

(11) When the dry-to-wet weight ratio of each sub-sample has been calculated in accordance with subsection (10), the average of the ratios must be calculated.

(12) The average dry-to-wet weight ratio specified in subsection (11) must be used to estimate the dry weight of the fallen dead wood collected and weighed on the same day that the sub-samples specified in subsection (5) were collected.

(13) The carbon stocks contained in the fallen dead wood in the plot must be calculated using Equation 18.

Division 5.2 Calculating project emissions

5.46 Calculating fuel emissions from project activities

A project proponent must calculate emissions from fossil fuel that is combusted while carrying out a project activity in the project area, in accordance with Equations 24 and 25.

5.47 Calculating fire emissions from a stratum

A project proponent must calculate the emissions of methane (CH_4) and nitrous oxide (N_2O) as a result of fire events in accordance with section 3.5 and Equations 26a to 27d.

Part 6 Calculating the carbon dioxide equivalent net abatement amount for a project in relation to a reporting period

Division 6.1 Preliminary

6.1 General

(1) For paragraph 106(1)(c) of the Act, this Part sets out requirements that must be met to calculate the carbon dioxide equivalent net abatement amount for a reporting period for a project to which this Determination applies.

(2) In this Part:

(a) all calculations are in respect of activities undertaken, or outcomes achieved, during the reporting period for the eligible offsets project; and

(b) unless otherwise specified, a reference to a project is a reference to an eligible offsets project that meets the requirements of Part 2.

(3) The data used in the calculations set out in Division 6.2 must comply with the data collection requirements set out in Subdivision 6.2.15.

6.2 Greenhouse gas assessment boundary

Only the greenhouse gases set out in column 2 of the following table must be taken into account when making calculations under this Part in respect of the carbon sources and sinks specified in column 1.

Note No other gases, carbon pools or emission sources may be taken into account.

Carbon pools and emission sources	Greenhouse gas
Emissions from fuel use: project forest establishment and management activities occurring within the project area	Carbon dioxide (CO_2) Methane (CH_4) Nitrous oxide (N_2O)

Emissions from fires occurring within the project area	Methane (CH_4) Nitrous Oxide (N_2O) *For a single pre-plant prescribed burn: not accounted for.* *CH_4 and N_2O arising from the burning of project trees included where fire event affects >10 hectares of a stratum within a reporting period.*
Above-ground and below-ground live project tree biomass (including fire affected).	Carbon dioxide (CO_2)
Above-ground dead standing project tree biomass (including fire affected).	Carbon dioxide (CO_2) *This is optional*
Litter and fallen dead wood.	Carbon dioxide (CO_2) *This is optional*

6.3 Calculating the baseline for the project

For the purposes of paragraph 106(4)(f) of the Act, the baseline for the project is taken to be zero.

6.4 Requirements for calculating carbon dioxide equivalent net abatement

(1) Carbon dioxide equivalent net abatement must be calculated by subtracting project emissions from project removals, in accordance with Equation 1a.

(2) A project proponent must calculate project emissions in accordance with Division 5.2.

(3) A project proponent must calculate project removals in accordance with Division 5.1 and applying one of the following measurement processes within each stratum in the project:

(a) a full inventory; or

(b) PSP assessment.

(4) The methods specified in subsection (3) must be carried out no earlier than 6 months before the submission of an offsets report.

Full inventory

(5) A full inventory must be conducted for each stratum in accordance with section 5.2 and at the following times:

(a) no earlier than 6 months before the submission of the first offsets report to reference the stratum; and

(b) for the period between the offsets report specified in paragraph (a) and the commencement of the maintenance phase, at least every 5 years from each subsequent offsets report that references a full inventory for the stratum.

(6) In addition to the circumstances specified in subsection (5), a full inventory must be conducted at the times specified in subsection 3.5(8) or 3.6(2).

Note Sections 3.5 and 3.6 deal with revisions of strata due to growth disturbances and other reasons.

PSP assessment

(7) If a project proponent chooses to conduct a PSP assessment within a stratum:

(a) a full inventory must have been previously conducted within the stratum in accordance with subsection (5); and

(b) the PSP assessment must be conducted in accordance with Subdivision 5.1.6.

Division 6.2 Calculations

Subdivision 6.2.1 Calculating carbon dioxide equivalent net abatement amount

6.5 General

For paragraph 106(1)(c) of the Act, the carbon dioxide equivalent net abatement amount for a reporting period for an offsets project to which this Determination applies is taken, for the purposes of the Act, to be the amount calculated in accordance with this Subdivision of the Determination.

6.6 Calculating the carbon dioxide equivalent net abatement amount

(1) The calculation of the carbon dioxide equivalent net abatement amount for a project must:

(a) be calculated in accordance with this section; and

(b) incorporate an assessment of uncertainty, calculated in accordance with Equation 1b.

(2) The carbon dioxide equivalent net abatement amount for a project is to be calculated for a reporting period using the following formula:

$GA_{Ri} = \Delta C_{Project\ ,Ri} - PE_{Ri}$	**Equation 1a**

where:

GA_{Ri} = net abatement amount for a project for a reporting period (Ri), in tonnes of CO_2-e (t CO_2-e).

Ri = a generic reference to a reporting period, which is applied interchangeably to refer to reporting periods referencing full inventory (R_{FI}), or PSP assessment (R_{PS}) events within a stratum.

$\Delta C_{Project\ ,Ri}$ = carbon stock change for a project for a reporting period (Ri) in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 2a.

PE_{Ri} = project emissions for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 23a.

6.7 Calculating uncertainty for net abatement amount

(1) Uncertainty for the net abatement amount for a project is to be calculated as a 90% confidence interval in accordance with this section.

(2) The size of the 90% confidence interval for the net abatement amount for a project is to be calculated for a reporting period (Ri) using the following formula:

$90GA_{Ri} = SEGA_{Ri} \times T_{Val}$	**Equation 1b**

where:

$90GA_{Ri}$ = half the width of the 90% confidence interval for net abatement amount for a project for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SEGA_{Ri}$ = standard error for net abatement amount for a project for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 1c.

T_{Val} = two-sided students t-value for the 90% confidence level with the appropriate degrees of freedom, calculated in accordance with Equation 1d.

6.8 Calculating standard error for net abatement amount

The standard error for the net abatement amount for a project is to be calculated for a reporting period using the following formula:

$SEGA_{Ri} = \left[\left(SE\Delta C_{Project\ ,Ri}\right)^2 + (SEPE_{Ri})^2\right]^{0.5}$	**Equation 1c**

where:

$SEGA_{Ri}$ = standard error for net abatement amount for a project for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SE\Delta C_{Project\ ,Ri}$ = standard error for carbon stock change for a project for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 2b.

$SEPE_{Ri}$ = standard error for project emissions for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 23b.

6.9 Calculating degrees of freedom for net abatement amount

The degrees of freedom for calculating the confidence interval for the net abatement for a project is to be calculated using the following formula:

$$df_{Ri} = \frac{\left[\sum_{j=1}^{n}\left(SE\Delta C_{Stratum\ ,j,Ri}\right)^2\right]^2}{\sum_{j=1}^{n}\left[\left(SE\Delta C_{Stratum\ ,j,Ri}\right)^4 \Big/ \left(-1 + n_{Stratum\ ,j,Ri}\right)\right]}$$	**Equation 1d**

where:

df_{Ri} = degrees of freedom for calculating the confidence interval for the net abatement amount for a project for reporting period Ri.

Ri = reporting period, as a calendar date.

$SE\Delta C_{Stratum\ ,j,Ri}$ = standard error for the carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 3c and 3d.

$n_{Stratum\ ,j,Ri}$ = number of plots measured for the jth stratum during reporting period Ri.

Subdivision 6.2.2 Calculating carbon stock change

6.10 Calculating carbon stock change for a project

(1) The calculation of the carbon stock change for a project must:

(a) be calculated in accordance with Equation 2a; and

(b) incorporate a standard error calculation in accordance with Equation 2b.

(2) The carbon stock change for a project is to be calculated for a reporting period using the following formula:

$$\Delta C_{Project\ ,Ri} = \sum_{j=1}^{n} \Delta C_{Stratum\ ,j,Ri}$$	**Equation 2a**

where:

$\Delta C_{Project,Ri}$ = carbon stock change for the project for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

$\Delta C_{Stratum,j,Ri}$ = carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 3a and 3b.

Ri = reporting period, as a calendar date.

n = number of strata.

(3) When calculating the carbon stock change for a project for a reporting period, the standard error is to be calculated using the following formula:

$$SE\Delta C_{Project,Ri} = \left(\sum_{j=1}^{n} SE\Delta C_{Stratum,j,Ri}{}^{2}\right)^{0.5}$$	**Equation 2b**

where:

$SE\Delta C_{Project,Ri}$ = standard error for the carbon stock change for a project area for reporting period, in tonnes of CO_2-e (t CO_2-e).

$SE\Delta C_{Stratum,j,Ri}$ = standard error for the carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 3c and 3d.

Ri = reporting period, as a calendar date.

n = number of strata.

6.11 Calculating carbon stock change for a stratum

(1) The calculation of the carbon stock change for the first and subsequent reporting periods in which a stratum is referenced must:

(a) be calculated in accordance with:

(i) Equation 3a for the first reporting period; or

(ii) Equation 3b for subsequent reporting periods;

and

(b) incorporate a standard error calculation in accordance with:

(i) Equation 3c for the first reporting period; or

(ii) Equation 3d for subsequent reporting periods.

(2) Carbon stock change for a stratum is to be calculated for the first reporting period in which the stratum is referenced (Ri) using the following formula:

$\Delta C_{Stratum,j,Ri} = CC_{Stratum,j,Ri} - IC_{Stratum,j}$	**Equation 3a**

where:

$\Delta C_{Stratum,j,Ri}$ = carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

$CC_{Stratum,j,Ri}$ = closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5a.

$IC_{Stratum,j}$ = initial carbon stocks for the jth stratum in tonnes of CO_2-e, calculated in accordance with Equation 4a.

Ri = first reporting period for the jth stratum, as a calendar date.

(3) The carbon stock change for a stratum that has been referenced in a previous offsets report is to be calculated for the current reporting period (Ri) using the following formula:

$\Delta C_{Stratum,j,Ri} = CC_{Stratum,j,Ri} - CC_{Stratum,j,Ri-1}$	**Equation 3b**

$\Delta C_{Stratum,j,Ri}$ = carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

$CC_{Stratum,j,Ri}$ = closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5a or 6a.

$CC_{Stratum,j,Ri-1}$ = closing carbon stocks for the jth stratum for reporting period $Ri - 1$ in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5a or 6a.

Ri = current reporting period referencing either a full inventory R_{FI}, or a PSP assessment R_{PS}, as a calendar date.

$Ri - 1$= reporting period immediately preceding the current reporting period (Ri) and referencing a full inventory or a PSP assessment, as a calendar date.

(4) When calculating the carbon stock change for the first reporting period in which a stratum is referenced (Ri), the standard error is to be calculated using the following formula:

$SE\Delta C_{Stratum,j,Ri} = \left[(SECC_{Stratum,j,Ri})^2 + (SEIC_{Stratum,j})^2\right]^{0.5}$	**Equation 3c**

where:

$SE\Delta C_{Stratum,j,Ri}$ = standard error for the carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

$SEIC_{Stratum,j}$ = standard error for the initial carbon stocks for the jth stratum in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 4b.

$SECC_{Stratum,j,Ri}$ = standard error for the closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5b.

Ri = first reporting period in which the stratum is referenced in an offsets report, as a calendar date.

(5) When calculating the carbon stock change within a stratum that has been referenced in a previous offsets report ($Ri - 1$), the standard error is to be calculated for the current reporting period (Ri) using the following formula:

$SE\Delta C_{Stratum,j,Ri} = \left[(SECC_{Stratum,j,Ri})^2 + (SECC_{Stratum,j,Ri-1})^2\right]^{0.5}$	**Equation 3d**

where:

$SE\Delta C_{Stratum,j,Ri}$ = standard error for the carbon stock change for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

$SECC_{Stratum,j,Ri}$ = standard error for the closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 5b and 6b.

$SECC_{Stratum,j,Ri-1}$ = standard error for the closing carbon stocks for the jth stratum for reporting period $Ri - 1$ in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 5b and 6b.

Ri = current reporting period referencing either a full inventory R_{FI}, or a PSP assessment R_{PS}, as a calendar date.

$Ri - 1$= reporting period immediately preceding the current reporting period (Ri) and referencing a full inventory or a PSP assessment, as a calendar date.

Subdivision 6.2.3 Calculating initial carbon stocks for a stratum

6.12 Calculating initial carbon stocks for a stratum

(1) For a stratum that is composed of project trees planted on or after 1 July 2010:

(a) the initial carbon stocks for the stratum ($IC_{Stratum,j}$) is zero; and

(b) the standard error for the initial carbon stocks for the stratum ($SEIC_{Stratum,j}$) is zero.

(2) For a newly created stratum that is entirely composed of project trees planted before 1 July 2010 that have previously been referenced in an offsets report under an alternative stratum identifier:

(a) the initial carbon stocks for the newly created stratum ($IC_{Stratum,j}$) is zero; and

(b) the standard error for the initial carbon stocks for the newly created stratum ($SEIC_{Stratum,j}$) is zero.

(3) For a stratum that is partially composed of project trees planted before 1 July 2010 and that have been referenced in an offsets report, the initial carbon stocks for the stratum must:

(a) be calculated in accordance with Equation 4a; and

(b) incorporate a standard error calculated in accordance with Equation 4b.

(4) For a stratum that is entirely composed of project trees planted before 1 July 2010 and not previously referenced in an offsets report, the initial carbon stocks for the stratum must:

(a) be calculated in accordance with Equation 4a; and

(b) incorporate a standard error calculation in accordance with Equation 4b.

$IC_{Stratum,j} = \frac{CC_{Stratum,j,Ri}}{Age_{Stratum,j,Ri}} \times Y_{CFI,j}$	**Equation 4a**

where:

$IC_{Stratum,j}$ = initial carbon stocks for the jth stratum, in tonnes of CO_2-e (t CO_2-e).

$CC_{Stratum,j,Ri}$ = closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with

Equation 5a.

Ri = first reporting period for the jth stratum, as a calendar date.

$Age_{Stratum,j,Ri}$ = age of project trees in the jth stratum for reporting period Ri, calculated as the difference in absolute years between the planting finish date and the date for reporting period Ri.

$Y_{CFI,j}$ = difference in absolute years between the planting finish date for the jth stratum and 1 July 2010.

$$SEIC_{Stratum,j} = \frac{SECC_{Stratum,j,Ri}}{Age_{Stratum,j,Ri}} \times Y_{CFI,j} \qquad \textbf{Equation 4b}$$

where:

$SEIC_{Stratum,j}$ = standard error for initial carbon stocks for the jth stratum, in tonnes of CO_2-e (t CO_2-e).

$SECC_{Stratum,j,Ri}$ = standard error for closing carbon stocks for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equations 5b and 6b.

Ri = first reporting period for the jth stratum, as a calendar date.

$Age_{Stratum,j,Ri}$ = age of project trees in the jth stratum at the end of reporting period Ri, calculated as the difference in absolute years between the planting finish date and the date at the end of reporting period Ri.

$Y_{CFI,j}$ = difference in absolute years between the planting finish date for the jth stratum and 1 July 2010.

Subdivision 6.2.4 Calculating closing carbon stocks for a stratum

6.13 Calculating closing carbon stocks for a stratum based on full inventory

(1) This section applies if a full inventory has been conducted within a stratum no earlier than six months before the end of a reporting period (R_{FI}).

(2) The closing carbon stocks for a reporting period in which a full inventory has been conducted must:

(a) be calculated in accordance with Equation 5a; and

(b) incorporate a standard error calculation in accordance with Equation 5b.

(3) The closing carbon stocks for a reporting period in which a full inventory has been conducted within a stratum are to be calculated using the following formula:

$CC_{Stratum,j,R_{FI}} = MPC_{Stratum,j,R_{FI}} \times A_{Stratum,j,R_{FI}}$	**Equation 5a**

where:

$CC_{Stratum,j,R_{FI}}$ = closing carbon stocks for the jth stratum for reporting period R_{FI}, in tonnes of CO_2-e (t CO_2-e).

R_{FI} = most recent reporting period during which full inventory has taken place in the jth stratum, as a calendar date.

$MPC_{Stratum,j,R_{FI}}$ = mean plot carbon stocks for plots within the jth stratum for reporting period R_{FI} in tonnes of CO_2-e per hectare (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11a.

$A_{Stratum,j,R_{FI}}$ = land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{FI}.

(4) When calculating the closing carbon stocks within a stratum for a reporting period in which a full inventory has been conducted, the standard error is to be calculated using the following formula:

$SECC_{Stratum,j,R_{FI}} = SEMPC_{Stratum,j,R_{FI}} \times A_{Stratum,j,R_{FI}}$	**Equation 5b**

where:

$SECC_{Stratum,j,R_{FI}}$ = standard error for closing carbon stocks for the jth stratum for reporting period R_{FI}, in tonnes of CO_2-e (t CO_2-e).

R_{FI} = most recent reporting period to reference full inventory in the jth stratum, as a calendar date.

$SEMPC_{Stratum,j,R_{FI}}$ = standard error for mean plot carbon stocks in the jth stratum for reporting period R_{FI} in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11b.

$A_{Stratum,j,R_{FI}}$ = land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{FI}.

6.14 Calculating closing carbon stocks for a stratum based on PSP assessment

(1) This section applies if:

(a) a stratum has been referenced in an offsets report which relates to a previous reporting period (R_{FI}); and

(b) a full inventory was conducted within the stratum in reporting period R_{FI}; and

(c) a PSP assessment has been conducted within the stratum no earlier than six months before the end of the current reporting period (R_{PS}).

(2) The closing carbon stocks for a stratum for a reporting period in which a PSP assessment has been conducted within the stratum in accordance with subsection (1) must:

(i) be calculated in accordance with Equation 6a; and

(ii) incorporate a standard error calculation in accordance with Equation 6b.

(3) The closing carbon stocks for a stratum for a reporting period in which a PSP assessment has been conducted within the stratum in accordance with subsection (1) is to be calculated using the following formula:

$$CC_{Stratum,j,R_{PS}} = \left(LCC_{Stratum,j,R_{FI}} \times (LRPS_{Stratum,j,R_{PS}} - 1) + CC_{Stratum,j,R_{FI}}\right) \times \frac{A_{Stratum,j,R_{PS}}}{A_{Stratum,j,R_{FI}}}$$	**Equation 6a**

where:

$CC_{Stratum,j,R_{PS}}$ = closing carbon stocks for the jth stratum for reporting period R_{PS}, in tonnes of CO_2-e (t CO_2-e).

$LCC_{Stratum,j,R_{FI}}$ = lower confidence bound for closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 7.

R_{PS} = current reporting period during which a PSP assessment has been conducted in the jth stratum, as a calendar date.

R_{FI} = most recent reporting period to reference full inventory in the jth stratum, as a calendar date.

$LRPS_{Stratum,j,R_{PS}}$ = lower confidence bound for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}, calculated in accordance with Equation 8.

$CC_{Stratum,j,R_{FI}}$ = closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5a.

$A_{Stratum,j,R_{PS}}$ = land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{PS}.

$A_{Stratum,j,R_{FI}}$ = land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{FI}.

(4) When calculating the closing carbon stocks for a stratum for a reporting period in which a PSP assessment has been conducted in accordance with subsection (1), the standard error must be calculated using the following formula:

$$SECC_{Stratum,j,RPS} = \left(SECC_{Stratum,j,R_{FI}}{}^{2} \times SEMRPS_{Stratum,j,R_{PS}}{}^{2} + SECC_{Stratum,j,R_{FI}}{}^{2} \times LRPS_{Stratum,j,R_{PS}}{}^{2} + SEMRPS_{Stratum,j,R_{PS}}{}^{2} \times LCC_{Stratum,j,R_{FI}}{}^{2}\right)^{0.5} \times \frac{A_{Stratum,j,R_{PS}}}{A_{Stratum,j,R_{FI}}}$$	**Equation 6b**

where:

$SECC_{Stratum,j,R_{PS}}$ = standard error for closing carbon stocks for the jth stratum for reporting period R_{PS}, in tonnes of CO_2-e (t CO_2-e).

$SECC_{Stratum,j,R_{FI}}$ = standard error for closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5b.

R_{PS} = current reporting period during which PSP assessment has been conducted in the jth stratum, as a calendar date.

R_{FI} = most recent reporting period to reference full inventory in the jth stratum, as a calendar date.

$SEMRPS_{Stratum,j,R_{PS}}$ = standard error for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}, calculated in accordance with Equation 9b.

$LCC_{Stratum,j,R_{FI}}$ = lower confidence bound for closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 7.

$LRPS_{Stratum,j,R_{PS}}$ = lower confidence bound for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}, calculated in accordance with Equation 8.

$A_{Stratum,j,R_{PS}}$ = land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{PS}.

$A_{Stratum,j,R_{FI}}$ =	land area in hectares (ha) occupied by the jth stratum at the end of reporting period R_{FI}.

Subdivision 6.2.5 Calculating lower confidence bound

6.15 Calculating the lower confidence bound for closing carbon stocks for a stratum

The lower confidence bound for the closing carbon stocks for a stratum is to be calculated for a reporting period using the following formula:

$LCC_{Stratum,j,R_{FI}} = CC_{Stratum,j,R_{FI}} - (T_{Val} \times SECC_{Stratum,j,R_{FI}})$	**Equation 7**

where:

$LCC_{Stratum,j,R_{FI}}$ =	lower confidence bound for closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e).
R_{FI} =	most recent reporting period to reference full inventory in the jth stratum, as a calendar date.
$CC_{Stratum,j,R_{FI}}$ =	closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5a.
T_{val} =	two-sided students t-value for the 90% confidence level at the appropriate degrees of freedom (n -1), where n is the number of plots assessed in the jth stratum during reporting period R_{FI}.
$SECC_{Stratum,j,R_{FI}}$ =	standard error for closing carbon stocks for the jth stratum for reporting period R_{FI} in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 5b.

6.16 Calculating the lower confidence bound for mean ratio of change in PSP carbon stocks

The lower confidence bound for the mean ratio of change in PSP carbon stocks is to be calculated for a reporting period using the following formula:

$LRPS_{Stratum,j,R_{PS}} = MRPS_{Stratum,j,R_{PS}} - (T_{Val} \times SEMRPS_{Stratum,j,R_{PS}})$	**Equation 8**

where:

$LRPS_{Stratum,j,R_{PS}}$ = lower confidence bound for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}.

R_{PS} = current reporting period during which PSP assessment has been conducted in the jth stratum, as a calendar date.

$MRPS_{Stratum,j,R_{PS}}$ = mean ratio of change in PSP carbon stocks for permanent sample plots occurring in the jth stratum for reporting period R_{PS}, weighted by the closing carbon stocks in the same permanent sample plots at reporting period R_{FI}, calculated in accordance with Equation 9a.

T_{val} = two-sided students t-value for the 90% confidence level at the appropriate degrees of freedom (n -1), where n is the number of permanent sample plots in stratum j assessed during reporting period R_{PS}.

$SEMRPS_{Stratum,j,R_{PS}}$ = standard error for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}, calculated in accordance with Equation 9b.

Subdivision 6.2.6 Calculating mean ratio of change in PSP carbon stocks

6.17 Calculating the mean ratio of change in PSP carbon stocks

(1) The weighted average for the values of PSP carbon stock change ratios must:

(a) be calculated in accordance with Equation 9a; and

(b) incorporate a standard error calculation in accordance with Equation 9b.

(2) The weighted average for the values of PSP carbon stock change ratios is to be calculated using the following formula:

$$MRPS_{Stratum,j,R_{PS}} = \frac{\sum_{p=1}^{n}\left(C_{Plot,p,R_{FI}} \times CR_{PS,p,R_{PS}}\right)}{\sum_{p=1}^{n} C_{Plot,p,R_{FI}}}$$ **Equation 9a**

where:

$MRPS_{Stratum,j,R_{PS}}$ = mean ratio of change in PSP carbon stocks for permanent sample plots occurring in the jth stratum for reporting period R_{PS} weighted by the closing carbon stocks in the same permanent sample plots at reporting period R_{FI}.

R_{PS} = current reporting period during which a PSP assessment has been conducted in the jth stratum, as a calendar date.

R_{FI} = most recent reporting period to reference a full inventory in the jth stratum, as a calendar date.

$CR_{PS,p,R_{PS}}$ = ratio of change in PSP carbon stocks, within the pth permanent sample plot in the jth stratum for reporting period R_{PS}, calculated in accordance with Equation 10.

$C_{Plot,p,R_{FI}}$ = carbon stocks in carbon pools assessed within permanent sample plot p in the jth stratum for reporting period R_{FI} in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 12a.

n = number of permanent sample plots assessed in the jth stratum during reporting period R_{PS}.

(3) When calculating the mean ratio of change in PSP carbon stocks, the standard error is to be calculated using the following formula:

$$SEMRPS_{Stratum,j,R_{PS}} = \frac{\sigma CR_{Stratum,j,R_{PS}}}{\sqrt{n}}$$	**Equation 9b**

where:

$SEMRPS_{Stratum,j,R_{PS}}$ = standard error for mean ratio of change in PSP carbon stocks for permanent sample plots in the jth stratum for reporting period R_{PS}.

R_{PS} = current reporting period during which a PSP assessment has been conducted in the jth stratum, as a calendar date.

$\sigma CR_{Stratum,j,R_{PS}}$ = standard deviation of ratio of change in PSP carbon stocks calculated in accordance with Equation 10, for permanent sample plots in the jth stratum for reporting period R_{PS}.

n = number of permanent sample plots assessed in the jth stratum during reporting period R_{PS}.

6.18 Calculating the ratio of change in PSP carbon stocks

The ratio between:

(a) the PSP carbon stocks for an individual PSP (p) for the current reporting period during which a PSP assessment has been conducted (R_{PS}); and

(b) the carbon stocks reported for the same PSP (p) in the most recent offsets report to reference a full inventory (R_{FI});

is to be calculated using the following formula:

$$CR_{PS,p,R_{PS}} = \frac{C_{PS,p,R_{PS}}}{C_{Plot,p,R_{FI}}}$$	**Equation 10**

where:

$CR_{PS,p,R_{PS}}$ = ratio of change in PSP carbon stocks within the pth permanent sample plot between reporting period R_{PS} and reporting period R_{FI}.

R_{PS} = current reporting period during which permanent sample plot p was assessed as part of PSP assessment, as a calendar date.

R_{FI} = most recent reporting period to reference a full inventory in a stratum, as a calendar date.

$C_{PS,p,R_{PS}}$ = carbon stocks in carbon pools assessed within permanent sample plot p for reporting period R_{PS} in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 12b.

$C_{Plot,p,R_{FI}}$ = carbon stocks in carbon pools assessed within permanent sample plot p for reporting period R_{FI}, in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e) and calculated in accordance with Equation 12a.

Note In the case where $C_{Plot,p,R_{FI}}$ is equal to zero for permanent sample plot p, then permanent sample plot p must be ignored for the purposes of Equations 9a, 9b and 10.

Subdivision 6.2.7 Calculating mean plot carbon stocks for a stratum

6.19 Calculating mean plot carbon stocks for a stratum

(1) The mean plot carbon stocks for a stratum must:

(a) be calculated in accordance with Equation 11a; and

(b) incorporate a standard error calculation in accordance with Equation 11b.

(2) The mean plot carbon stocks for a stratum ($MPC_{Stratum}$) for reporting period Ri is to be calculated using the following formula:

$$MPC_{Stratum,j,Ri} = \frac{\sum_{p=1}^{n} C_{Plot,p,Ri}}{n}$$	**Equation 11a**

where:

$MPC_{Stratum,j,Ri}$ = mean plot carbon stocks for plots within the jth stratum for reporting period Ri in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e).

Ri = reporting period, as a calendar date.

$C_{Plot,p,Ri}$ = carbon stocks in carbon pools assessed within plot p for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equations 12a and 12b.

p = a plot, being either a TSP or PSP.

n = number of plots assessed within the jth stratum during reporting period Ri.

(3) When calculating the mean plot carbon stocks for a stratum, the standard error is to be calculated using the following formula:

$$SEMPC_{Stratum,j,Ri} = \frac{\sigma}{\sqrt{n}}$$	**Equation 11b**

where:

$SEMPC_{Stratum,j,Ri}$ = standard error for mean plot carbon stocks for plots within the jth stratum for reporting period Ri, in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

Ri = reporting period, as a calendar date.

σ = standard deviation of plot carbon stocks, calculated in accordance with Equations 12a and 12b, for plots assessed in the jth stratum for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

n = number of plots assessed within the jth stratum during reporting period Ri.

Subdivision 6.2.8 Calculating carbon stocks in a plot

6.20 Calculating carbon stocks within a plot assessed as part of full inventory

The carbon stocks in a TSP or PSP assessed as part of a full inventory are to be calculated using the following formula:

$$C_{Plot,p,R_{FI}} = C_{T,p} + C_{FireT,p} + C_{DT,p} + C_{FireDT,p} + C_{LI,p} + C_{Fallen,p}$$	**Equation 12a**

where:

$C_{Plot,p,R_{FI}}$ = carbon stocks in carbon pools assessed within plot p for reporting period R_{FI} in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

p = a plot, being either a TSP or PSP.

R_{FI} = reporting period during which full inventory has taken place, as a calendar date.

$C_{T,p}$ = carbon stocks in live trees within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 13.

$C_{FireT,p}$ = carbon stocks in live fire affected trees within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 14.

$C_{DT,p}$ = carbon stocks in dead standing trees within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 15.

$C_{FireDT,p}$ = carbon stocks in dead standing fire affected trees within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 16.

$C_{LI,p}$ = carbon stocks in litter within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 17.

$C_{Fallen,p}$ = carbon stocks in fallen dead wood in plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 18.

6.21 Calculating carbon stocks within a PSP assessed as part of PSP assessment

The carbon stocks in a PSP assessed as part of a PSP assessment are to be calculated using the following formula:

$C_{PS,p,R_{PS}} = C_{T,p} + C_{FireT,p} + C_{DT,p} + C_{FireDT,p} + C_{LI,p} + C_{Fallen,p}$	**Equation 12b**

where:

$C_{PS,p,R_{PS}}$ = carbon stocks in carbon pools assessed within permanent sample plot p for reporting period R_{PS} in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

p = permanent sample plot.

R_{PS} = reporting period during which PSP assessment has taken place, as a calendar date.

$C_{T,p}$ = carbon stocks in live trees within PSP p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 13.

$C_{FireT,p}$ = carbon stocks in live fire affected trees within PSP p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 14.

$C_{DT,p}$ = carbon stocks in dead standing trees within PSP p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 15.

$C_{FireDT,p}$ = carbon stocks in dead standing fire affected trees within PSP p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 16.

$C_{LI,p}$ = carbon stocks in litter within PSP p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 17.

$C_{Fallen,p}$ = carbon stocks in fallen dead wood in PSP p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 18.

Subdivision 6.2.9 Calculating carbon stocks in trees, fallen dead wood, and litter

6.22 Calculating carbon stocks in live trees within a plot

The amount of carbon contained within the biomass of live trees within plot p is to be calculated using the following formula:

$C_{T,p} = \frac{44}{12} \times CF_T \times \frac{1}{A_p} \times B_{T,p} \times 0.001$	**Equation 13**

where:

$C_{T,p}$ = carbon stocks in live trees within plot p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e).

CF_T = carbon fraction of biomass in live trees as a proportion and applying a value of 0.5.

A_p = area of plot p in hectares (ha).

$B_{T,p}$ = total biomass in live trees within plot p in kilograms of dry matter, calculated in accordance with Equation 19.

p = plot identification number.

6.23 Calculating carbon stocks in live fire affected trees within a plot

The amount of carbon contained within the biomass of live fire affected trees within plot p is to be calculated using the following formula:

$$C_{FireT,p} = \frac{44}{12} \times CF_{FireT} \times \frac{1}{A_p} \times B_{FireT,p} \times 0.001$$ **Equation 14**

where:

$C_{FireT,p}$ = carbon stocks in live fire affected trees within plot p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e).

CF_{FireT} = carbon fraction of biomass in live fire affected trees as a proportion and applying a value of 0.5.

A_p = area of plot p in hectares.

$B_{FireT,p}$ = total biomass in live fire affected trees within plot p in kilograms of dry matter, calculated in accordance with Equation 20.

p = plot identification number.

6.24 Calculating carbon stocks in dead standing trees within a plot

The amount of carbon contained within the biomass of dead standing trees within plot p is to be calculated using the following formula:

$$C_{DT,p} = \frac{44}{12} \times CF_{DT} \times \frac{1}{A_p} \times B_{DT,p} \times 0.001$$ **Equation 15**

where:

$C_{DT,p}$ = carbon stocks in dead standing trees within plot p in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e).

CF_{DT} = carbon fraction of biomass in dead standing trees as a proportion and applying a value of 0.5.

A_p = area of plot p in hectares (ha).

$B_{DT,p}$ = total biomass in dead standing trees within plot p in kilograms of dry matter, calculated in accordance with Equation 21.

p = plot identification number.

6.25 Calculating carbon stocks in dead standing fire affected trees within a plot

The amount of carbon contained within the biomass of dead standing fire affected trees within plot p is to be calculated using the following formula:

$$C_{FireDT,p} = \frac{44}{12} \times CF_{FireDT} \times \frac{1}{A_p} \times B_{FireDT,p} \times 0.001$$ **Equation 16**

where:

$C_{FireDT,p}$ =	carbon stocks in dead standing fire affected trees within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).
CF_{FireDT} =	carbon fraction of biomass in dead standing fire affected trees as a proportion and applying a value of 0.5.
A_p =	area of plot p in hectares.
$B_{FireDT,p}$ =	total biomass in dead standing fire affected trees within plot p in kilograms of dry matter, calculated in accordance with Equation 22.
p =	plot identification number.

6.26 Calculating carbon stocks in litter within a plot

The amount of carbon contained within litter in plot p is to be calculated using the following formula:

$$C_{LI,p} = \frac{44}{12} \times CF_{LI} \times \frac{1}{a_p} \times B_{LI\_WET,p} \times DWR_{LI,p} \times 0.001$$ **Equation 17**

where:

$C_{LI,p}$ =	carbon stocks in litter within plot p in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).
CF_{LI} =	carbon fraction of dry biomass in litter as a proportion and applying a value of 0.5.
a_p =	total area of land sampled using litter sampling frame for plot p, in hectares (ha).
$B_{LI\_WET,p}$ =	wet weight of the bulked sample for litter collected from plot p, in kilograms (kg).
$DWR_{LI,p}$ =	dry-wet weight ratio of litter calculated from sub-samples collected on the same day that plot p was assessed.
p =	plot identification number.

6.27 Calculating carbon stocks in fallen dead wood within a plot

The amount of carbon contained within fallen dead wood in plot p is to be calculated using the following formula:

$C_{Fallen,p} = \frac{44}{12} \times CF_{Fallen} \times \frac{1}{A_p} \times B_{Fallen\_WET,p} \times DWR_{Fallen,p} \times 0.001$	**Equation 18**

where:

$C_{Fallen,p}$ = carbon stocks in fallen dead wood within plot p, in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e).

CF_{Fallen} = carbon fraction of dry biomass in fallen dead wood as a proportion and applying a value of 0.5.

$B_{Fallen\_WET,p}$ = wet weight of fallen dead wood collected from plot p, in kilograms (kg).

$DWR_{Fallen,p}$ = dry-wet weight ratio of fallen dead wood calculated from sub-samples collected on the same day that plot p was assessed.

A_p = area of plot p, in hectares (ha).

p = plot identification number.

Subdivision 6.2.10 Calculating biomass in trees

6.28 Calculating biomass in live trees within a plot

The total biomass contained in live trees within plot p is to be calculated using the following formula:

$B_{T,p} = \sum_{j=1}^{n} B_{T,j}$	**Equation 19**

where:

$B_{T,p}$ = total biomass in live trees within plot p, in kilograms of dry matter.

$B_{T,j}$ = biomass of jth live tree within plot p, in kilograms of dry matter.

p = plot identification number.

n = number of live trees within plot p.

6.29 Calculating biomass in live fire affected trees within a plot

The total biomass contained in live fire affected trees within plot p is to be calculated using the following formula:

$$B_{FireT,p} = \sum_{j=1}^{n} B_{FireT,j}$$	**Equation 20**

where:

$B_{FireT,p}$ = total biomass in live fire affected trees within plot p, in kilograms of dry matter.

$B_{FireT,j}$ = biomass of jth live tree within plot p, in kilograms of dry matter.

p = plot identification number.

n = number of live fire affected trees within plot p.

6.30 Calculating biomass in dead standing trees within a plot

The total biomass contained in dead standing trees within plot p is to be calculated using the following formula:

$$B_{DT,p} = \sum_{j=1}^{n} B_{DT,j}$$	**Equation 21**

where:

$B_{DT,p}$ = total biomass in dead standing trees within plot p, in kilograms of dry matter.

$B_{DT,j}$ = biomass of the jth dead standing tree in plot p, in kilograms of dry matter.

p = plot identification number.

n = number of dead standing trees in plot p.

6.31 Calculating biomass in dead standing fire affected trees within a plot

The total biomass contained in dead standing fire affected trees within plot p is to be calculated using the following formula:

$$B_{FireDT,p} = \sum_{j=1}^{n} B_{FireDT,j}$$	**Equation 22**

where:

$B_{FireDT,p}$ = total biomass in dead standing fire affected trees within plot p, in kilograms of dry matter.

$B_{FireDT,j}$ = biomass of the jth dead standing fire affected tree in plot p, in kilograms of dry matter.

p = plot identification number.

n = number of dead standing fire affected trees in plot p.

Subdivision 6.2.11 Calculating project emissions

6.32 Calculating project emissions

(1) Project emissions for a reporting period (Ri) must:

(a) include emissions arising from:

(i) fuel use (fuel emissions); and

(ii) fire events that affect more than 10 hectares of a stratum (fire emissions); and

(b) be calculated in accordance with Equation 23a; and

(c) incorporate a standard error calculation in accordance with Equation 23b.

(2) The project emissions for a reporting period (Ri) are to be calculated using the following formula:

$$PE_{Ri} = \sum_{j=1}^{n} \left(FuelE_{j,Ri} + FireE_{j,Ri} \right)$$	**Equation 23a**

where:

PE_{Ri} = project emissions for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$FuelE_{j,Ri}$ = fuel emissions for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 24.

$FireE_{j,Ri}$ = fire emissions for the jth fire affected stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 26d.

n = the number of strata in the project.

(3) When calculating the project emissions for a reporting period (Ri), the standard error is to be calculated using the following formula:

$$SEPE_{Ri} = \left(\sum_{j=1}^{n} SEFireE_{j,Ri}{}^{2}\right)^{0.5}$$	**Equation 23b**

where:

$SEPE_{Ri}$ = standard error for project emissions for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SEFireE_{j,Ri}$ = standard error for fire emissions for the jth fire affected stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 27d.

n = the number of strata in the project.

6.33 Calculating fuel emissions for a stratum

Emissions from fuel use within a stratum (j) for a reporting period (Ri) are to be calculated using the following formula:

$$FuelE_{j,Ri} = \sum_{i=1}^{n}\sum_{y=1}^{g} FTE_{i,y,j,Ri}$$	**Equation 24**

where:

$FuelE_{j,Ri}$ = fuel emissions for the jth stratum for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$FTE_{i,y,j,Ri}$ = emissions for each fossil fuel type (i) and each greenhouse gas (y), being carbon dioxide, methane or nitrous oxide, for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 25.

y = greenhouse gas type, being carbon dioxide, methane or nitrous oxide.

n = number of different types of fossil fuel (i).

g = number of different gas types (y) emitted.

Note When calculating the emissions from fuel use within a stratum for a reporting period, the standard error is assumed to be zero.

6.34 Calculating emissions for fossil fuel types

Emissions of carbon dioxide, methane, or nitrous oxide from combustion of fossil fuels for a reporting period (Ri) are to be calculated using the following formula:

$FTE_{i,y,j,Ri} = \frac{QF_{i,j,Ri} \times EC_i \times Fac_{i,y}}{1000}$	**Equation 25**

where:

$FTE_{i,y,j,Ri}$ = emissions for each fossil fuel type (i) and each greenhouse gas (y), being carbon dioxide, methane or nitrous oxide, for the jth stratum for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$QF_{i,j,Ri}$ = the quantity of fossil fuel type (i) combusted for the jth stratum during reporting period Ri in kilolitres.

EC_i = energy content factor of fossil fuel type (i) in gigajoules per kilolitre.

$Fac_{i,y}$ = emission factor for each gas type (y) for fossil fuel type (i) in kilograms of CO_2-e per gigajoule.

> ***Note*** Emissions from fossil fuel use must be estimated using the energy content and emission factors outlined in Schedule 1, Part 3 of the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, as amended from time to time.

Subdivision 6.2.12 Calculating emissions for fire affected stratum

6.35 Calculating emissions for a fire affected stratum

(1) This section applies if:

(a) a stratum (y) experiences a fire event during a reporting period (Ri);

(b) the fire event exceeds the area threshold of 10 hectares;

(c) the part of stratum y affected by the fire is separated as fire affected stratum j, in accordance with section 3.5; and

(d) a full inventory is conducted in both the fire-affected and non-fire-affected strata within 12 months of the date of the fire event in accordance with section 3.5.

(2) The weight (t) of elemental carbon (C) released as a result of a fire event must:

(a) be calculated in accordance with Equation 26a; and

(b) incorporate a standard error calculation in accordance with Equation 27a.

(3) The weight of elemental carbon released as a result of a fire event in a stratum for a reporting period is to be calculated using the following formula:

$FCE_{j,Ri} = \frac{12}{44} \times (MPC_{Stratum,y,Ri} - MPC_{Stratum,j,Ri}) \times A_{j,Ri}$	**Equation 26a**

where:

$FCE_{j,Ri}$ = weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri, in tonnes of carbon (t C).

Ri = reporting period, as a calendar date.

$MPC_{Stratum,y,Ri}$ = mean plot carbon stocks for plots within non-fire affected stratum y for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11a.

$MPC_{Stratum,j,Ri}$ = mean plot carbon stocks for plots within fire affected stratum j for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11a.

$A_{j,Ri}$ = land area occupied by fire affected stratum j at the end of reporting period Ri, in hectares (ha).

Note Where $MPC_{Stratum,y,Ri}$ is less than $MPC_{Stratum,j,Ri}$, emissions of methane and nitrous oxide are assumed to be zero.

(4) The amount of methane emitted from a fire-affected stratum for a reporting period is to be calculated as follows:

$CHE_{j,Ri} = FCE_{j,Ri} \times 0.150822$	**Equation 26b**

where:

$CHE_{j,Ri}$ = amount of CH_4 emitted from fire affected stratum j for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$FCE_{j,Ri}$ = weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri in tonnes of carbon (t C), calculated in accordance with Equation 26a.

(5) The amount of nitrous oxide emitted from a fire-affected stratum for a reporting period is to be calculated as follows:

$NOE_{j,Ri} = FCE_{j,Ri} \times 0.041224$	**Equation 26c**

where:

$NOE_{j,Ri}$ = amount of N_2O emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$FCE_{j,Ri}$ = weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri, in tonnes of carbon (t C), calculated in accordance with Equation 26a.

(6) The total emissions of methane and nitrous oxide from a fire-affected stratum for a reporting period is to be calculated as follows:

$FireE_{j,Ri} = CHE_{j,Ri} + NOE_{j,Ri}$	**Equation 26d**

where:

$FireE_{j,Ri}$ = fire emissions for the jth fire affected stratum during reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$CHE_{j,Ri}$ = amount of CH_4 emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 26b.

$NOE_{j,Ri}$ = amount of N_2O emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 26c.

6.36 Calculating the standard error for fire emissions

(1) When calculating the emissions for a fire affected stratum, the standard error is to be calculated using the following formula:

$SEFCE_{j,Ri} = \frac{12}{44} \times \left(SEMPC_{Stratum,y,Ri}{}^2 + SEMPC_{Stratum,j,Ri}{}^2\right)^{0.5} \times A_{j,Ri}$	**Equation 27a**

where:

$SEFCE_{j,Ri}$ = standard error for weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri, in tonnes of carbon (t C).

Ri = reporting period, as a calendar date.

$SEMPC_{Stratum,y,Ri}$ = standard error for mean plot carbon stocks for plots within non-fire affected stratum y for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11b.

$SEMPC_{Stratum\ ,j,Ri}$ = standard error for mean plot carbon stocks for plots within fire affected stratum j for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11b.

$A_{j,Ri}$ = land area occupied by fire affected stratum j at the end of reporting period Ri, in hectares (ha).

Note Where $MPC_{Stratum\ ,y,Ri}$ is less than $MPC_{Stratum\ ,j,Ri}$, the standard errors for mean emissions of methane and nitrous oxide are assumed to be zero.

(2) When calculating the amount of methane emitted from a fire-affected stratum for a reporting period, the standard error is to be calculated using the following formula:

$SECHE_{j,Ri} = SEFCE_{j,Ri} \times 0.150822$	**Equation 27b**

where:

$SECHE_{j,Ri}$ = standard error for the amount of methane (CH_4) emitted from fire affected stratum j for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SEFCE_{j,Ri}$ = standard error for weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri in tonnes of carbon (t C), calculated in accordance with Equation 27a.

(3) When calculating the amount of nitrous oxide emitted from a fire-affected stratum for a reporting period, the standard error is to be calculated using the following formula:

$SENOE_{j,Ri} = SEFCE_{j,Ri} \times 0.041224$	**Equation 27c**

where:

$SENOE_{j,Ri}$ = standard error for the amount of nitrous oxide (N_2O) emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SEFCE_{j,Ri}$ = standard error for weight of elemental carbon emitted from fire affected stratum j as a result of the fire for reporting period Ri in tonnes of carbon (t C), calculated in accordance with Equation 27a.

(4) When calculating the total emissions of methane and nitrous oxide from a fire-affected stratum for a reporting period, the standard error is to be calculated using the following formula:

$$SEFireE_{j,Ri} = \left(SECHE_{j,Ri}{}^{2} + SENOE_{j,Ri}{}^{2}\right)^{0.5}$$	**Equation 27d**

where:

$SEFireE_{j,Ri}$ = standard error for fire emissions for the jth fire affected stratum for reporting period Ri, in tonnes of CO_2-e (t CO_2-e).

Ri = reporting period, as a calendar date.

$SECHE_{j,Ri}$ = standard error for the amount of methane (CH_4) emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 27b.

$SENOE_{j,Ri}$ = standard error for the amount of nitrous oxide (N_2O) emitted from fire affected stratum j for reporting period Ri in tonnes of CO_2-e (t CO_2-e), calculated in accordance with Equation 27c.

Subdivision 6.2.13 Calculating probable limit of error

6.37 Calculating probable limit of error for carbon stock estimates

The probable limit of error around mean carbon stock values for a set of plots within a stratum is to be calculated using the following formula:

$$PLE_{j,Ri} = \left(\frac{SEMPC_{Stratum,j,Ri} \times T_{val}}{MPC_{Stratum,j,Ri}}\right) \times 100$$	**Equation 28**

where:

$PLE_{j,Ri}$ = probable limit of error for the jth stratum for reporting period Ri, as a percentage.

Ri = reporting period, as a calendar date.

$SEMPC_{Stratum,j,Ri}$ = standard error for mean plot carbon stocks for plots within the jth stratum for reporting period Ri in tonnes per hectare of CO_2-e ($t.ha^{-1}$ CO_2-e), calculated in accordance with Equation 11b.

T_{Val} = two-sided students t-value for the 90% confidence level at the appropriate degrees of freedom (n -1), where n is the number of plots assessed in the jth stratum during reporting period Ri.

$MPC_{Stratum\ ,j,Ri}$ = mean plot carbon stocks for plots within the jth stratum for reporting period Ri in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e), calculated in accordance with Equation 11a.

6.38 Calculating number of plots required for probable limit of error

(1) The number of plots likely to be required to achieve a target probable limit of error must be calculated in accordance with Equations 29a to 29b.

(2) The coefficient of variation for the sample population of plots is to be calculated using the following formula:

$CV = \frac{\sigma}{\bar{x}} \times 100$	**Equation 29a**

where:

CV = coefficient of variation, as a percentage.

σ = standard deviation for the sample population, in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

$\bar{x}$ = mean value calculated for the sample population, in tonnes per hectare of CO_2-e (t.ha^{-1} CO_2-e).

(3) The minimum number of plots likely to be required to achieve a target probable limit of error is to be calculated as follows:

$n = \frac{CV^2 \times Tval^2}{PLE^2}$	**Equation 29b**

where:

n = minimum number of plots required, rounded up to nearest whole number.

CV = coefficient of variation as a percentage, calculated in accordance with Equation 29a.

T_{val} = two-sided students t-value for the 90% confidence level at the appropriate (m -1, where m is the number of plots in the sample population used to estimate CV) degrees of freedom.

PLE = target probable limit of error, as a percentage.

Subdivision 6.2.14 Calculating biomass for biomass sample trees and test trees

6.39 Calculating total biomass for biomass sample trees and test trees

The total biomass for a biomass sample tree or a test tree is to be calculated using the following formula:

$$B_{BST} = \sum_{k=1}^{n} B_{Component\ ,k}$$	**Equation 30**

where:

B_{BST} = total biomass for the biomass sample tree or test tree, in kilograms of dry matter.

n = the number of biomass components within the biomass sample tree or test tree.

$B_{Component\ ,k}$ = biomass for biomass component k, in kilograms of dry matter, calculated in accordance with Equation 31.

6.40 Calculating the dry weight of biomass components for biomass sample trees and test trees

The dry weight of biomass components for a biomass sample tree or a test tree is to be calculated using the following formula:

$$B_{Component\ ,k} = FW_{Component\ ,k} \times DWR_{Component\ ,k}$$	**Equation 31**

where:

$B_{Component\ ,k}$ = biomass for biomass component k in kilograms of dry matter.

$FW_{Component\ ,k}$ = fresh-weight of biomass component k in kilograms of wet matter.

$DWR_{Component\ ,k}$ = dry-wet weight ratio of biomass component k calculated from the oven dried biomass component or the oven dried sub-samples of the biomass component.

k = biomass component being, for example, stem, branch, crown, tap root or lignotuber, and lateral roots.

6.41 Calculating the variance of weighted residuals for biomass sample trees and test trees

(1) The variance of weighted residuals for a set of biomass sample trees or test trees must be calculated in accordance with Equations 32a to 32c.

(2) The variance of weighted residuals for:

(a) a set of biomass sample trees that have been assessed as part of the process for developing an allometric function; or

(b) a set of test trees that have been assessed as part of the process for validating an allometric function;

is to be calculated using the following formula:

$\sigma^2 = \frac{\sum WR_i^{\ 2}}{n - p}$	**Equation 32a**

where:

σ^2 = variance of weighted residuals in kilograms (kg).

WR_i = weighted residual in kilograms (kg) for tree i, calculated in accordance with Equation 32b.

i = a biomass sample tree or a test tree.

n = the number of biomass sample trees or test trees, as a whole number.

p = the number of parameters in the allometric function, as a whole number.

(3) The weighted residual for a biomass sample tree or a test tree is to be calculated using the following formula:

$WR_i = w_i(B_i - PB_i)$	**Equation 32b**

where:

WR_i = weighted residual in kilograms (kg) for tree i.

i = a biomass sample tree or a test tree.

B_i = biomass in kilograms (kg) for tree i measured through destructive sampling.

PB_i = biomass in kilograms (kg) for tree i predicted from the allometric function.

w_i = weighting factor applied to tree i, calculated in accordance with Equation 32c.

(4) The weighting factor applied to a biomass sample tree or test tree is to be calculated using the following formula:

$$w_i = \frac{1}{(BA_i)^{0.5}}$$	**Equation 32c**

where:

w_i = weighting factor applied to tree i.

BA_i = basal area of tree i in square metres (m^2).

i = a biomass sample tree or a test tree.

6.42 Calculating the F-test statistic

(1) The F-test statistic must be calculated in accordance with this section.

(2) The F-test statistic calculated in accordance with this section must be compared against a critical F-value ($F_\propto$) to determine if there is a statistically significant difference (a<0.05) between the variance of weighted residuals for:

(a) test trees; and

(b) the biomass sample trees from which the allometric function subject to the validation test was developed.

(3) The degrees of freedom for the comparison specified in subsection (2) are to be calculated in accordance with Equation 33b.

(4) The F-test statistic is to be calculated using the following formula:

$$F = \frac{\sigma_{TT}^2}{\sigma_{AF}^2}$$	**Equation 33a**

where:

F = F-test statistic.

σ_{TT}^2 = variance of weighted residuals calculated for test trees.

σ_{AF}^2 = variance of weighted residuals calculated for biomass sample trees.

(5) The degrees of freedom for the comparison between the value for F derived using Equation 33a and the critical value for the F-test statistic ($F_{\propto, n_{TT}-p, n_{AF}-p}$), are to be calculated using the following formula:

Numerator: $n_{TT} - p$ Denominator: $n_{AF} - p$	**Equation 33b**

where:

n_{TT} = number of test trees, as a whole number.

n_{AF} = number of biomass sample trees used to develop the allometric function, as a whole number.

p = number of parameters in the allometric function, as a whole number.

Subdivision 6.2.15 Data collection

6.43 Project emissions

Fuel emissions

(1) A project proponent must retain records that can be used to estimate the quantity of fuel, recorded in kilolitres (kL), for each fuel type combusted when undertaking project activities within the project area within a reporting period.

Fire emissions

(2) A project proponent must collect data relating to the occurrence of fire events in accordance with section 3.5.

6.44 Project removals

A project proponent must measure the following items, in the manner specified, for the purposes of calculating project removals:

(a) predictor measures for allometric functions;

(b) stratum area, expressed in hectares (ha);

(c) TSP and PSP area, expressed in hectares (ha), and measured each time a plot is established;

(d) predictor measures, collected for each project tree located within each plot assessed;

(e) the number, expressed as an integer, of project trees located within each plot assessed; and

(f) tree species, recorded alphabetically and collected for each project tree located within each plot assessed.

Part 7 Monitoring, record-keeping and reporting requirements

Division 7.1 General

7.1 Application

For the purposes of subsection 106(3) of the Act, a proponent of an offsets project to which this Determination applies must comply with the monitoring, record-keeping and reporting requirements of this Part.

Division 7.2 Monitoring requirements

7.2 Project monitoring

(1) For reporting periods occurring between Commencement and the start of the maintenance phase for a stratum:

(a) the measurement processes specified in subsections 6.4(3) to 6.4(7) must be applied; and

(b) the following may be used to monitor the project:

(i) on-ground inspections and surveys; and

(ii) remote monitoring such as interpretation of aerial or satellite imagery.

(2) For a stratum in the maintenance phase, the monitoring processes specified in paragraph (1)(b) may be used without performing the measurement processes specified in paragraph (1)(a).

(3) Contemporary ortho-rectified aerial imagery of each stratum must be sourced no less frequently than at 5 years after the date of the end of the reporting period referenced in the first offsets report for each stratum and again at the end of the crediting period.

(4) Subject to Part 3, if the project monitoring specified in subsections (1) to (3) indicates that the project requirements specified in subsection 2.3(2) are not met across part or all of a stratum, the non-compliant area must not be included in the calculations for the stratum area.

Note Part 3 sets out the requirements for delineating boundaries.

Note Subsection 2.3(2) sets out height and crown cover requirements for project trees established within strata.

(5) Subject to subsection (6), if the project monitoring indicates that the project requirements specified in subsection 2.3(2) are not met for a stratum, then for the purposes of the processes specified in Division 5.1:

(a) the stratum area must be recorded as zero; and

(b) any carbon stocks must be excluded from the stratum.

(6) Subject to Part 3, if the project monitoring specified in subsections (1) to (3) indicates that the project requirements specified in subsection 2.3(2) are not met for a stratum, a project proponent may redefine stratum boundaries so that any land that does not meet the project requirements specified in subsection 2.3(2) is not included in the stratum area.

(7) A project proponent must monitor growth disturbance events within the project area and record the features of these events in accordance with the requirements specified at sections 3.5 and 7.17.

Note Under section 81 of the Act the Regulator must be notified of certain natural disturbance events.

Division 7.3 Offsets report requirements

Subdivision 7.3.1 Information that must be included in the first offsets report

7.3 General

(1) For paragraph 6.2(j) of the Regulations, this Subdivision sets out the information that is required to be submitted in the first offsets report for a project to which this Determination applies.

(2) The first offsets report for a project must also include the information set out in Subdivision 7.3.2.

7.4 Project information

The first offsets report for a project must contain:

(a) land title references for land over which the project is located;

(b) geospatial data files detailing the boundary of the project area; and

(c) hard-copy maps showing the boundary of the project area.

7.5 Stratum description and status

The first offsets report must contain the following information in relation to each stratum that it references:

(a) geospatial data files detailing the boundary of the stratum;

(b) hard-copy maps showing the boundary of the stratum;

(c) a description of the planting method applied within the stratum and records demonstrating that the establishment of project trees has been through planting;

(d) if available, the number of project tree seedlings planted per hectare within the stratum;

(e) planting start date and planting finish date;

(f) if the planting finish date for each stratum occurred before 1 July 2010, the number of years between 1 July 2010 and the planting finish date for the stratum; and

(g) a description of the rationale for stratification.

7.6 Baseline land use history and forest cover history for strata

(1) The first offsets report must contain the following information in relation to each stratum that it references:

(a) a written statement confirming the stratum area was clear of non-project forest for at least 5 years before Commencement;

(b) if the stratum area was clear of forest at 31 December 1989, a written statement confirming the stratum area was clear of forest at that time; and

(c) a description of the land use occurring within the stratum area for at least 5 years before Commencement.

(2) The first offsets report must contain the following information in relation to the land in each stratum that the report references:

(a) ortho-rectified aerial imagery demonstrating:

(i) ongoing management of land under a cleared regime for at least 5 years before Commencement; and

(ii) historic non-project forest cover in relation to the stratum area, including at the times specified in paragraphs (1)(a) and (1)(b); or

(b) if the information specified in paragraph (a) is indistinct or not available, any of the following:

(i) farm management plans;

(ii) land-use records;

(iii) statutory declarations from landowners and land managers describing the land-use patterns.

7.7 Quality assurance and control

The first offsets report for a project must include documented procedures for the following quality assurance and control measures:

(a) identifying and correcting data transcription errors;
(b) conducting training of field staff for the purposes of conducting full inventory and PSP assessment; and
(c) conducting equipment checks and equipment calibration.

Subdivision 7.3.2 Information that must be included in all offsets reports

7.8 General

For paragraph 6.2(j) of the Regulations, this section sets out the information that is required to be submitted in an offsets report for a project to which this Determination applies.

Note The first offsets report for a project must also contain the information specified in Subdivision 7.3.1.

7.9 Project information

An offsets report must include the following information about the project:

(a) list of strata identifiers for strata occurring within the project area at the end of the reporting period;
(b) net greenhouse gas abatement for the project for the reporting period and associated standard error;
(c) change in carbon stocks for the project for the reporting period and associated standard error; and
(d) estimated project emissions for the reporting period and associated standard error.

7.10 Strata location and area

An offsets report must include the following information about the location and area of strata occurring within the project area at the end of the reporting period:

(a) land area associated with each stratum, in hectares;
(b) written description of the location of each stratum;
(c) hard-copy maps showing the location and boundary of each stratum; and
(d) if ortho-rectified aerial imagery has been obtained by the project proponent in relation to the stratum area during the reporting period – the imagery or, if not yet collected, the date the imagery is next intended to be collected.

7.11 Stratum description and status

(1) The first time a stratum is referenced in an offsets report, or if a stratum has been redefined in accordance with Part 3 since the last offsets report submitted for the project, the information specified in sections 7.5 and 7.6 must be included in the offsets report.

(2) An offsets report must include the following information about the status of each stratum occurring within the project area at the end of the reporting period:

(a) the amount of time since the last offsets report to reference the stratum was submitted to the Regulator;

(b) for project trees, the tree types noted as occurring within the stratum during the reporting period;

(c) anticipated crown cover across the stratum area when project trees are at maturity;

(d) anticipated height at maturity for project trees occurring within the stratum;

(e) the occurrence of any natural disturbance events within the stratum during the reporting period; and

(f) whether the stratum is in the establishment phase, management phase, or maintenance phase during the reporting period.

7.12 Carbon stocks for stratum

An offsets report must include the following information about carbon stocks for each stratum occurring within the project area at the end of the reporting period:

(a) number of years since the last full inventory to be referenced in an offsets report took place within the stratum;

(b) a written statement confirming a full inventory or PSP assessment has taken place within the stratum, whichever has occurred most recently;

(c) dates that the most recent measurement process reported in accordance with paragraph (b) was conducted;

(d) the number of plots assessed within the stratum during the most recent measurement process reported in accordance with paragraph (b), expressed as the total number of plots assessed and the number of plots assessed per hectare;

(e) maps showing actual location for plots assessed within the stratum during the most recent measurement process reported in accordance with paragraph (b);

(f) estimate of project tree height for the stratum at the date of the most recent measurement process reported in accordance with paragraph (b);

(g) for project trees, the mean number of live trees calculated across all plots at the date of the most recent measurement process reported in accordance with paragraph (b);

(h) estimate of average crown cover, expressed as a percentage, across all plots at the date of the most recent measurement process reported in accordance with paragraph (b);

(i) mean, maximum, and minimum values for predictor measures calculated across all plots at the date of the most recent measurement process reported in accordance with paragraph (b);

(j) mean carbon stocks and associated standard error and probable limit of error calculated across all plots at the date of the most recent measurement process reported in accordance with paragraph (b);

(k) estimate of stratum carbon stocks, associated standard error and, where calculated, outcomes of Equations 4a to 6b at the date of the most recent measurement process reported in accordance with paragraph (b);

(l) estimate of carbon stocks at 1 July 2010, or at the time the project's previous offsets report was submitted, whichever is the more recent date;

(m) carbon stock change since 1 July 2010, or the time the project's previous offsets report was submitted, whichever is the more recent date; and

(n) a list of allometric functions applied during the current reporting period within the stratum.

7.13 Carbon stocks for plots

An offsets report for a project must include the following information about plots assessed as part of full inventory or PSP assessment occurring during the reporting period:

(a) type of plot (TSP or PSP) and plot identifier;

(b) actual location and identity of plot;

(c) type of most recent assessment performed (full inventory or PSP assessment) on the plot and the date of assessment;

(d) dimensions and shape of the plot, including an estimate of the land area occupied by the plot;

(e) an estimate of project tree height for the plot at the date of the most recent assessment performed;

(f) number of live trees, expressed as trees per hectare, calculated for the plot at the date of the most recent assessment performed;

(g) estimated crown cover as a percentage across the plot at the date of the most recent assessment performed;

(h) mean value for predictor measure calculated across the plot at the date of the most recent assessment performed;

(i) plot carbon stocks calculated at the date of the most recent assessment performed;

(j) number of project trees associated with each tree type represented in the plot; and

(k) allometric functions applied to estimate biomass within the plot.

7.14 Basis of allometric function applied to a stratum

At the first application of an allometric function to a stratum for the purposes of calculating carbon stocks in accordance with Subdivision 6.2.10, an offsets report must include the following:

(a) a sampling plan detailing the approach to the selection of biomass sample trees used to develop the allometric function, documented in accordance with Subdivision 5.1.3; and

(b) an allometric report documented in accordance with section 5.29.

7.15 Application of allometric functions

An offsets report must include the following information about the application of allometric functions:

(a) list of allometric functions applied within strata during the reporting period;

(b) description of allometric domain for all allometric functions applied within strata during the reporting period;

(c) outcomes of the compatibility checks specified in section 5.41, confirming that any allometric function applied during the reporting period is applicable to project trees within strata; and

(d) outcomes of the validation test for allometric functions specified in subsections 5.42(1) to 5.42(19), where the allometrics have been applied during the reporting period.

7.16 Sampling plans

An offsets report for a project must include sampling plans developed in accordance with Subdivision 5.1.3 for any full inventory, PSP assessment, biomass sample tree, or test tree assessment undertaken during the reporting period.

7.17 Growth disturbance events

An offsets report for a project must include the following information about any growth disturbance events that occur during the reporting period:

(a) date of, and the time elapsed since, the disturbance;

(b) stratum area affected by the disturbance, including maps of affected areas and supporting geospatial data;

(c) nature and severity of the event, including a statement detailing the project proponent's opinion on the likely long-term impact on carbon stocks, and the anticipated time to recovery of the affected area;

(d) any action taken to separate the affected land area as a disturbance affected stratum or a fire affected stratum;

(e) actions taken to restore carbon stocks;

(f) details of any monitoring activities undertaken, or intended to be undertaken, and the outcomes of those activities; and

(g) calculations for methane (CH_4) and nitrous oxide (N_2O) emissions associated with any fire affected stratum.

7.18 Quality assurance and control

An offsets report for a project must include the following information about quality assurance and control measures:

(a) any documented procedures for identifying and correcting data transcription errors that have been updated since the first offsets report for the project;

(b) outcomes of data transcription error checks and a description of corrective actions taken;

(c) any documented procedures for conducting training of field staff for the purposes of conducting full inventory and PSP assessment that have been updated since the first offsets report for the project; and

(d) any documented procedures for conducting equipment checks and equipment calibration that have been updated since the first offsets report for the project.

7.19 Fuel use

An offsets report for a project must include the following information:

(a) an estimate of fossil fuel use in relation to delivering project activities within a stratum; and

(b) emissions arising from the fossil fuel use.

Division 7.4 Record-keeping requirements

Note See paragraph 106(3)(c) of the Act and regulation 17.1 of the Regulations.

7.20 Records that must be kept

For paragraph 17.1(2)(b) of the Regulations, a project proponent must make a record of the information specified in Division 7.3 and in this Division.

7.21 Stratum records

The following records about stratum descriptions, location, and area must be created and maintained:

(a) spatial data and mapping files stored in a geographical information system; and

(b) original ortho-rectified aerial images.

7.22 Project tree measures

The following records about each individual project tree assessed from within plots during full inventory or PSP assessment must be created and maintained:

(a) tree type;

(b) estimated biomass;

(c) the allometric function applied to generate the estimate specified in paragraph (b); and

(d) predictor measure values.

7.23 Carbon stock calculations

All input data for, and the result of, each equation set out in Division 6.2 must be maintained.

7.24 Allometric functions

The following records about allometric functions must be created and maintained:

(a) allometric reports;

(b) equipment checks; and

(c) staff training records.

7.25 Sampling plans

Sampling plans must be retained as records.

7.26 Quality assurance and control

Records relating to the following quality assurance and control measures must be created and maintained:

(a) document archiving and versioning;

(b) staff training in relation to the delivery of full inventory, PSP assessment and biomass sample tree assessment;

(c) type of measurement equipment used to collect measures during any of the activities specified in Division 5.1;

(d) measurement equipment calibration undertaken and equipment checks applied when collecting measures during any of the activities specified in Division 5.1; and

(e) corrective action taken where the equipment checks specified in paragraph (d) indicate equipment is returning inaccurate measures.

7.27 Fuel use

Records relating to fuel use, including invoices, must be created and maintained.

Note

1. All legislative instruments and compilations are registered on the Federal Register of Legislative Instruments kept under the *Legislative Instruments Act 2003.* See www.frli.gov.au.