EXPLANATORY STATEMENT

Issued by the Authority of the Parliamentary Secretary for Climate Change, Industry and Innovation

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Credits (Carbon Farming Initiative) (Avoided Deforestation) Methodology Determination 2013

Background

The *Carbon Credits (Carbon Farming Initiative) Act 2011* (the Act) enables the crediting of greenhouse gas abatement in the land sector. Greenhouse gas abatement is achieved by either reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or trees.

Abatement activities are undertaken as offsets projects. The process involved in establishing an offsets project is set out in Part 3 of the Act. An offsets project must be covered by, and undertaken in accordance with, a methodology determination.

Subsection 106(1) of the Act empowers the Minister to make, by legislative instrument, a determination known as a methodology determination. The purpose of a methodology determination is to establish procedures for estimating abatement (emissions reductions and sequestration) and project rules for monitoring, record keeping and reporting on abatement.

A methodology determination must meet the offsets integrity standards set out in section 133 of the Act and the other eligibility criteria set out in section 106 of the Act. The Minister cannot make a methodology determination unless the Domestic Offsets Integrity Committee (the DOIC) has endorsed the proposal for the methodology determination under section 112 of the Act and advised the Minister of the endorsement under section 113 of the Act. The DOIC is an independent expert panel established to evaluate proposals for methodology determinations.

Application of the Determination

The *Carbon Credits (Carbon Farming Initiative) (Avoided Deforestation) Methodology Determination 2013* (the Determination) sets out the detailed rules for implementing and monitoring a native forest protection project under the Carbon Farming Initiative (CFI). These rules are in addition to the requirements of the Act and the *Carbon Credits (Carbon Farming Initiative) Regulations 2011* (the Regulations). Section 5 of the Act provides that a native forest protection project is a project to: (a) remove carbon dioxide from the atmosphere by sequestering carbon in trees in one or more native forests; and (b) avoid emissions of greenhouse gases attributable to the clearing or clear-felling of a native forest.

For the purposes of the Act, a project conducted under the Determination is also a sequestration offsets project. This means that provisions in the Act that apply to sequestration offsets projects, including permanence obligations, apply to projects conducted under the Determination.

Abatement

The Determination applies to a native forest that may be cleared for conversion into cropland or grassland. Abatement is achieved by not clearing the native forest and thereby avoiding the emissions that clearing would have produced. Additional abatement may be achieved by managing the native forest in a way that enhances carbon stocks. The way in which abatement and sequestration are credited is set out in Division 3.4

Application for declaration

A project proponent wanting to implement a project under the Determination must make an application to the Clean Energy Regulator (the Regulator) under subsection 22(1) of the Act. The form of the application is prescribed by section 23 of the Act. Additional requirements in relation to the content of the application are prescribed by regulation 3.1 of the Regulations.

The project described in the application must meet the requirements for an eligible offsets project set out in subsection 27(4) of the Act. These requirements include compliance with the rules set out in the Determination.

Offsets projects that are undertaken in accordance with the Determination and approved by the Regulator can generate Australian carbon credit units (ACCUs) that can be sold to:

- Australian companies that pay the carbon price established under the *Clean Energy Act 2011*; or
- businesses in Australia wanting to offset their own carbon pollution.

Public consultation

The methodology proposal for Native Forest Protection (Avoided Deforestation) (the proposal) was developed by Greencollar Climate Solutions with Redd Forests (now Forests Alive) (the applicants). The applicants submitted the proposal for the DOIC's consideration on 16 August 2011.

The proposal underwent an independent technical review and was made available for public consultation on the website of the former Department of Climate Change and Energy Efficiency from 3 April 2012 to 13 May 2012. Eleven submissions relating to the proposal were received.

The DOIC considered the issues raised in the submissions during its assessment of the proposal as required under subsection 112(5) of the Act and requested further information from the applicants.

Following a further independent technical review and policy review, the applicants submitted a revised version of the proposal to the DOIC on 10 May 2013.

On 23 May 2013, the DOIC endorsed the revised proposal under section 112(2)(a) of the Act.

Greencollar Climate Solutions and the Regulator were consulted in the development of the Determination.

Determination details

The Determination is a legislative instrument within the meaning of the *Legislative Instruments Act 2003*.

The Determination commences retrospectively from 1 July 2010.

Retrospective commencement is authorised by subsection 122(3) of the Act, which provides that a determination can be expressed to have come into force on 1 July 2010 if the determination is made on or before 30 June 2013, and the application for endorsement was made on or before 30 June 2012. Both of these conditions are satisfied in this case.

Retrospective commencement of the Determination does not adversely affect the rights of any person or impose a liability on any person in respect of anything done or not done before the date of registration on the Federal Register of Legislative Instruments. Rather, retrospective application confers a benefit in that it allows persons to apply for and generate ACCUs in circumstances where they would not otherwise be eligible to apply.

Details of the Determination are at Attachment A.

A Statement of Compatibility with Human Rights prepared in accordance with the *Human Rights (Parliamentary Scrutiny) Act 2011* is at Attachment B.

Details of the Determination

Part 1 Preliminary

1.1 Name of Determination

Section 1.1 sets out the full name of the Determination, which is the *Carbon Credits (Carbon Farming Initiative) (Avoided Deforestation) Methodology Determination 2013.*

1.2. Commencement

Section 1.2 provides that the Determination commences retrospectively from1 July 2010. Retrospective commencement is authorised by subsection 122(3) of the Act.

The project proponent can earn credits only for abatement which occurs from 1 July 2010. Subsections 27(15) and (16) of the Act prevent the crediting of abatement before this date.

1.3 Definitions

Section 1.3 defines a number of terms used in the Determination.

Some terms that are not defined in the Determination have the meaning given by section 5 of the Act or the Regulations. The Act and Regulations are available at www.comlaw.gov.au

> ***Note*** Under section 23 of the *Acts Interpretation Act 1901*, words in the Determination in the singular number include the plural and words in the plural number include the singular.

1.4 Kind of project to which the Determination applies

The effect of paragraph 106(1)(a) of the Act is that a methodology determination must specify the kind of offsets project to which it applies.

The Determination applies to native forest protection projects. 'Native forest protection project' is defined in the Act as, 'a project: (a) to remove carbon dioxide from the atmosphere by sequestering carbon in trees in one or more native forests; and (b) to avoid emissions of greenhouse gases attributable to the clearing or clear-felling of one or more native forests'.

Part 2 Requirements for declaration as eligible project

2.1 Eligible projects

The effect of paragraph 106(1)(b) of the Act is that a methodology determination must set out requirements that must be met before a project can be declared an eligible offsets project.

To be declared an eligible offsets project, a project to which the Determination applies must meet the requirements specified in Part 2 of the Determination. These requirements are in addition to those set out in the Act and Regulations for applications for a declaration of an eligible offsets project.

Paragraph 27(4)(d) of the Act provides that the Regulator must not declare an offsets project to be an eligible offsets project unless the Regulator is satisfied that the project passes the additionality test, which has the meaning given by section 41 of the Act. The purpose of the additionality test is to ensure that credits are only issued for abatement that would not normally have occurred and, therefore, provides a genuine environmental benefit. It ensures that abatement in the project is additional to any abatement that would have occurred in the baseline.

Subsection 41(1) of the Act provides that, for the purposes of the Act, an offsets project passes the additionality test if: (a) the project is of a kind specified in the regulations; and (b) the project is not required to be carried out by or under a law of the Commonwealth, a State or a Territory. Regulation 3.28 specifies the kinds of projects mentioned in paragraph 41(1)(a). For the purposes of the Determination, the kind of project is a native forest protection project, set out in paragraph 3.28(1)(o) of the Regulations:

> the protection of native forest on freehold or leasehold land, on or after 1 July 2010, in relation to which:
>
> i. a Commonwealth, State or Territory law prohibits clearing, or conversion to a plantation, without consent; and
>
> ii. the landholder received consent, before 1 July 2010, for the clearing or conversion from the relevant Commonwealth, State, Territory or local regulatory authority responsible for giving the consent; and
>
> iii. the consent mentioned in subparagraph (ii) remains valid at the time of application to the Regulator for the declaration of the offsets project as an eligible offsets project; and
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> iv. the consent mentioned in subparagraph (ii) does not require an offset to mitigate any effect from the clearing or conversion to which it relates.

2.2 Location

This section requires that the project area must be located in Australia, including the external territories.

'Project area' is defined in the Act as, 'an area of land on which the project has been, is being, or is to be carried out'. An application to be declared an eligible offsets project under subsection 22(1) of the Act must be accompanied by a map of the project area produced in accordance with the Carbon Farming Initiative (CFI) Mapping Guidelines.

The CFI Mapping Guidelines provide for some flexibility in determining what constitutes the area of land in the project area. For example, they provide a simplified approach whereby

project proponents can include their whole land title as the project area. Alternatively a proponent can 'piece together' the project area from carbon estimation areas (CEAs), exclusion areas and clearing buffers.

2.3 Project area native forest

Section 2.3 provides that the project area must include a native forest. 'Native forest' is defined in section 5 of the Act.

Paragraph (a) provides that the native forest in the project area must have been native forest at 31 December 1989. This requirement corresponds to the definition of 'deforestation' in the Regulations.

Paragraph (b) provides that the native forest in the project area must have been standing at all times from 1 January 1990 to project commencement.

Paragraph (c) provides that the project proponent must hold clearing consent in relation to the native forest. 'Clearing' and 'consent' are defined in the Regulations. However, the Determination creates a narrower definition of 'clearing consent' than would result from a composite of these definitions. This is because, in the Regulations, 'clearing' can mean the conversion of native forest to settlements, and 'consent' can mean approval to convert native forest to plantation, neither of which are permitted by the Determination.

Subparagraph (i) provides that the clearing consent had to be issued before 1 July 2010. This requirement protects the integrity of the baseline by avoiding the situation where a person obtains a clearing consent, not for the primary or sole purpose of clearing a native forest, but rather for the primary or sole purpose of accruing ACCUs under the CFI.

Subparagraph (ii) provides that the clearing consent must provide that clearing is permitted for the purpose of converting the native forest to cropland or grassland. The Determination may be applied only to native forests that would be converted to cropland or grassland because other land uses could result in abatement which the calculations in the Determination are not intended to capture. For example, a plantation on the project land in the baseline could sequester a significant amount of carbon, which would have to be subtracted from the abatement achieved in the project. However, the Determination does not provide for the calculation of this kind of sequestration and so would over-estimate the amount of abatement achieved in the project.

Subparagraph (iii), as a corollary of subparagraph (ii), provides that the clearing consent must not allow the conversion of the native forest to plantation or settlements.

Subparagraph (iv) provides that the clearing consent must specify that once the native forest is converted to cropland or grassland, these land-uses must be maintained into the future. This supports the assumption under the baseline calculation that the native forest would not be permitted to regenerate. If other land-uses which resulted in sequestration were to occur in the future, they would require a different baseline calculation that reflected increasing baseline carbon stocks.

Paragraph (d) has the effect that project proponents must not have a licence or permit that enables them to remove wood from the native forest for commercial purposes. The carbon in such wood may be sequestered in wood products for a considerable time, and this would affect the accuracy of the baseline calculation which assumes that deforestation would cause that carbon to be emitted into the atmosphere as carbon dioxide.

Paragraph (e) provides that there must be no permit allowing the collection of firewood from the native forest. Permits are not required for the collection of firewood for personal use, which is permitted under the Determination because of its immaterial impact on carbon stocks. However, a permit for the collection of firewood would indicate that the large-scale collection of firewood is intended or possible, and this is prohibited under the Determination because it would have a material effect on carbon stocks.

2.4 Evidence relating to project area native forest

Section 2.4 lists the evidence that must be provided to the Regulator with an application under subsection 22(1) of the Act. The section does not operate to limit the evidence the Regulator may require from project proponents. For example, section 2.4 does not affect subsection 24(1) of the Act, which provides that the Regulator may, by written notice given to an applicant, require the applicant to give the Regulator, within the period specified in the notice, further information in connection with the application.

2.5 Project mechanism

Section 2.5 specifies the project mechanism. The project mechanism is implemented in CEAs and clearing buffers but not exclusion areas (see section 3.4 below).

Paragraph 2(a) provides that the project proponent must not clear the native forest in the project area that will be subject to the project mechanism.

Paragraph 2(b) provides that the project proponent must manage the native forest in the project area in order to achieve a mix of trees, shrubs and understory species. This provision ensures that native forests are not simply 'locked away' but rather are managed responsibly. It ensures that the project does not result in perverse or unintended environmental effects.

2.6 Project commencement

A project under the Determination commences on the day on which a declaration by the Regulator under subsection 27(2) of the Act takes effect. Subsection 27(15) of the Act provides that a declaration under subsection 27(2) takes effect: (a) when it is made; or (b) if (i) an earlier day is specified in the declaration; and (ii) the applicant has consented to the specification of the earlier day; on the day specified. The effect of subsection 27(16) of the Act is that a declaration may take effect as early as 1 July 2010.

Project proponents seeking backdating must provide documentary evidence that satisfies the Regulator that their project commenced prior to the application date. Evidence of this must include documents showing active management of the native forest or an intention to avoid clearing or establish a carbon project. Evidence of active management of the forest demonstrates that the proponent had decided to protect the native forest. Backdating should not be available where a landholder merely has yet to exercise their permitted right to clear.

Evidence of an intention not to clear the native forest or to establish a carbon project includes the registration of carbon property rights under state or territory laws in relation to the project area, or correspondence with carbon service providers, land clearing contractors, livestock businesses, agricultural advisors, local planning bodies, legal advisors or financial institutions showing an intention to conduct an offsets project.

Part 3 Requirements for operation of eligible projects

Division 3.1 Operation of eligible projects

Division 3.1 provides that an eligible offsets project to which the Determination applies must be operated in accordance with Part 3.

Division 3.2 Stratification

3.1 Stratification

Section 3.1 provides that the project area must be stratified, that is, divided into CEAs, exclusion areas and clearing buffers in accordance with Division 3.2. The project area must be stratified before the submission of the first offsets report.

3.2 Remotely-sensed imagery of project area

Subsection (1) provides that remotely-sensed imagery of the project area must be acquired for the purposes of stratification.

Subsection (2) provides that the remotely-sensed imagery must be consistent with the requirements of the CFI Mapping Guidelines.

Subsection (3) provides that the remotely-sensed imagery must be pre-processed in order to correct any irregular feature. This is necessary to ensure that the land cover assessment conducted in accordance with the next section is accurate.

3.3 Land-cover assessment

Section 3.3 sets out the requirements for performing a land-cover assessment, which is a critical part of the stratification process. A land-cover assessment must be performed whenever the project area is stratified or re-stratified.

Subsection (3) has the effect that there is no need to note features as areas of disturbance in the first land-cover assessment. This is because disturbances (such as bushfires) are only relevant in so far as they affect carbon stocks which have previously been accounted for in an offsets report.

3.4 Requirements for an exclusion area

Section 3.4 sets out the requirements for delineating exclusion areas. Exclusion areas are considered part of the project area but do not contribute to sequestration and are not included when calculating net abatement for the project. Exclusion areas provide proponents a degree of flexibility in managing and maintaining mapping of the project area without requiring an application for a variation to be submitted to the Regulator. The project mechanism is not implemented in exclusion areas.

3.5 Clearing buffers

Section 3.5 sets out the requirements in relation to clearing buffers.

Clearing consents may specify a proportion of forest that must not be cleared. If the project proponent's clearing consent contains this kind of specification, then they must delineate an area of native forest that *could have been cleared* under the consent but that contains the specified proportion (see Example 1). Such an area is known as a clearing buffer.

The project proponent may delineate two or more clearing buffers so long as, taken together, they cover an area containing the specified proportion (see Example 2).

If the clearing consent specifies that *particular* trees (or kinds of tree), for example trees of a certain species or size, must not be cleared, those trees must be categorised as non-project trees where they are found in biomass surveys in a CEA (see section 3.41).

Clearing buffers are part of the project area but are not counted in the abatement calculations in the Determination.

The monitoring requirements in Part 4 of the Determination apply in respect of clearing buffers.

It is important to note that the size of the clearing buffer(s) is governed by the size of the native forest to which the clearing permit applies and not the size of the project area. This is of particular importance where the project area does not cover the entire native forest (see Example 3). The reason for this is that trees in the project area may not be used to offset other land-use requirements.

Example 1

Jesse has a clearing consent for the native forest on his land. The clearing consent specifies that 20% of the native forest must not be cleared. When stratifying the project area, which covers the entire native forest on his land, Jesse delineates a single clearing buffer covering 20% of the native forest.

Example 2

Tanvi has a clearing consent for the native forest on her land. The clearing consent specifies that 20% of the native forest must not be cleared. When stratifying the project area, which covers the entire native forest on her land, Tanvi delineates two clearing buffers, one covering 15% of the native forest, and the other 5%.

Example 3

Steph has a clearing consent for the 2000 hectare native forest on her land. The clearing consent specifies that 20% (400 hectares) of the native forest must not be cleared. Steph decides to convert 1000 hectares of the native forest to cropland, but to conduct an offsets project in relation to the remaining 1000 hectares. Accordingly, her project area contains 1000 hectares, of which Steph must delineate a clearing buffer covering 400 hectares (20% of the total native forest) and not 200 hectares (20% of the project area).

3.6 Requirements for a carbon estimation area

Section 3.6 sets out the requirements for a CEA.

CEAs are areas of native forest in the project area that are protected in accordance with the project mechanism. Accordingly, the abatement calculations in the Determination are made in relation to the abatement and emissions which occur in the CEAs.

3.7 Re-stratification of carbon estimation areas

Section 3.7 provides for the re-stratification of CEAs.

Subsection (2) provides that, when a disturbance has been detected, the area affected by the disturbance must be re-stratified into a new CEA before the submission of the next offsets report.

Subsection (3) provides that when an area of disturbance is re-stratified, the CEAs touching its boundaries must be re-stratified too. In order to prevent double-crediting, CEAs must not overlap.

The Determination does not provide for the re-stratification of exclusion areas. This is because exclusion areas do not count towards project abatement. Exclusion areas that become areas of native forest during the crediting period cannot be re-stratified into CEAs because they could not have been cleared in the baseline.

Similarly, the Determination does not provide for the re-stratification of clearing buffers. Like exclusion areas, clearing buffers are established in relation to the baseline and do not contribute toward the project abatement.

3.8 Strata boundaries

Subsection (1) provides that the geographic boundaries of each CEA, exclusion area and clearing buffer in the project area must be identified on a geospatial map in accordance with the CFI Mapping Guidelines. The strata map does *not* have to be submitted with an application for an eligible offsets project under subsection 22(1) of the Act.

Subsection (2) provides that the strata map is required to be submitted with the first offsets report.

Subsection (3) provides that, if a CEA is re-stratified, the map must be amended and submitted with the next offsets report.

Division 3.3 Restrictions on activities

3.9 No commercial harvesting

Section 3.9 provides that no biomass may be removed from the project area for commercial purposes. For example, selling timber from the native forest is prohibited. Permitting the removal of biomass for commercial purposes would likely have a material impact on carbon stocks for the project which are not accounted for under the Determination.

3.10 Fuel wood, fencing and thinning

Section 3.10 applies only in respect of CEAs and clearing buffers. The Determination does not seek to restrict the activities project proponents can undertake in exclusion areas.

Paragraphs (a) and (b) provide that wood may be used from native forest for personal use as fuel wood or fencing materials provided no more than 5% of carbon stocks from the CEA or clearing buffer are removed. These activities are permitted because it is assumed that their effect on project carbon stocks is immaterial.

Paragraph (c) provides that thinning is permitted in limited circumstances. Although it constitutes the short-term loss of living biomass, thinning may lead to the enhancement of carbon stocks in the project area by promoting vegetation growth. Thinning may also result in greater biodiversity in the project area, a desirable environmental outcome.

The definition of 'thinning' in the Determination makes it clear that thinning must not amount to clearing, and that project proponents must not thin the native forest to the extent that thinning results in a reduction of estimated abatement below that which has already been credited under the Determination.

Division 3.4 Calculations

Subdivision 3.4.1 Baseline

3.11 Baseline

Section 3.11 specifies the project baseline as required under paragraph 106(4)(f) of the Act.

The baseline is a value representing the quantity of emissions that would have occurred had the project not been undertaken.

The baseline for a project under the Determination is the loss of carbon stocks in the CEAs if the deforestation plan had been implemented, calculated in accordance with Equation 27 in section 3.45.

3.12 Recording baseline activities—deforestation plan

Subsection (1) provides that a deforestation plan must be prepared in relation to the project area.

The deforestation plan describes what would have occurred in the project area if the project proponent were not protecting the native forest. The deforestation plan corresponds to the activities permitted and/or prohibited by the clearing consent.

Subsection (3) sets out the required content of the deforestation plan.

Subsection (4) provides that the content of the deforestation plan must be represented spatially, in accordance with the CFI Mapping Guidelines.

Subdivision 3.4.2 Allometric equations

Subdivision 3.4.2 sets out the process for developing or validating allometric equations in order to calculate the biomass in the project area. Allometric equations are used to estimate biomass from one or more non-destructive measures such as the diameter of the trunk at 1.3 metres (diameter at breast height). Different equations give different estimates for biomass because each one is designed for a specific range of variables including the type of forest and climate.

3.13 Allometric equations to be validated or developed

Section 3.13 provides that an allometric equation must be developed or validated for each species or species group measured in the biomass survey (see Subdivision 3.4.3). Project proponents can validate existing equations or develop new ones provided that they too are validated. The process for developing a new equation is set out in sections 3.15 to 3.25. Paragraph (b) sets out the requirements that an existing equation must meet if it is to be validated under the Determination. Validation ensures that carbon stocks in the project area are correctly accounted.

3.14 Validating or developing allometric equations

Section 3.14 provides that each allometric equation must be validated or developed using destructive sampling by carrying out the steps specified in Subdivision 3.4.2.

3.15 Step 1—Scope of allometry

Subsection (1) provides that allometric equations developed or validated apply only to the above-ground biomass of the native forest in the project area. A note refers to section 3.28, which provides that below-ground biomass is determined using prescribed root:shoot ratios.

Subsection (2) provides that an allometric equation may be applied only within its allometric domain.

3.16 Step 2—Determination of allometric domains

Subsection (1) defines ‘allometric domain’ as describing the specific conditions under which an allometric equation is likely to apply because the conditions that underpin it are satisfied. An allometric domain may apply to a single species or group of species.

Subsection (2) provides that an allometric domain must be defined for each allometric equation.

Subsection (3) sets out the requirements for defining an allometric domain.

Subsection (4) requires that if a new allometric equation is developed, the spatial extent of the equation must be specified.

Subsection (5) requires that if a pre-existing allometric equation is to be validated, the spatial extent of the equation must be specified if it has previously been defined for the equation.

Subsection (6) sets out additional requirements for defining an allometric domain for a group of species. Additional guidance for developing allometric equations for groups of species may be found in:

- Picard, N, et al. (2012) *Manual for building tree volume and biomass allometric equations: from field measurements to prediction.* Food and Agricultural Organization of the United Nations, Rome and Centre de Coopération Internationale en Recherche Agronomique pour le Développement, Montpellier.

3.17 Step 3—Sample size

The sample size required to generate a valid allometric equation will vary depending on whether the project proponent validates an existing equation or develops a new equation.

Subsection (1) provides that for each equation to be validated, at least six trees must be selected for destructive sampling, including at least one from each class size as defined in section 3.21.

Subsection (2) provides that for each equation to be developed, at least 20 trees must be selected for destructive sampling, including at least one tree from each class size as defined in section 3.21.

3.18 Step 4—Determination of plot design for tree selection

Once the sample size has been determined for validating or developing an allometric equation, the project proponent must determine the plot design for tree selection. Trees for the destructive sampling procedure will be collected from these plots.

Subsection (2) provides that enough plots must be allocated to capture at least 100 trees across the spatial domain of the study site. One hundred trees are specified as the minimum selected in order to increase the probability of identifying the full range of variables within the study site. In highly variable sites, project proponents may aim to capture more than 100 trees.

3.19 Step 5—Allocation of plots for tree selection

Once the plot design has been established for validating or developing an allometric equation, the project proponent must allocate plots for tree selection within the spatial extent of the allometric domain defined in section 3.16.

3.20 Step 6—Survey and random selection of trees for destructive sampling

Section 3.20 details the process for the selection of trees for destructive sampling.

Project proponents must establish plots and measure all trees within the plot. Each tree within the plot must be assigned a unique identifier so it can then be relocated if it is identified for destructive sampling. For each tree, project proponents must measure all parameters that will be used in the allometric equation (for example, diameter at breast height, total height, or species).

Project proponents must survey and establish enough plots such that the minimum sample size prescribed in section 3.17 has been achieved.

3.21 Step 7—Size classes

Prior to undertaking destructive sampling field work, the project proponent must classify the trees measured in section 3.20 by species or species group, and then into size classes in order to carry out the procedures to develop or validate an allometric equation.

Subsection (1) has the effect that individual tree species or species groups must be stratified into at least three size classes meeting the requirements of subsection (2). Project proponents may wish to choose the size classes based on the variation and sizes in the trees being sampled in order to optimise the process. Additional guidance on establishing size classes may be found in:

- Snowdon, P, et al. (2002) NCAS Technical Report no.31: Protocol for Sampling Tree and Stand Biomass, Australian Greenhouse Office.

Subsection (2) specifies that each class must have a minimum and maximum variable range identified and size class interval defined.

Subsection (3) requires project proponents to use a pseudo-random number generator with a known seed value to choose the trees that will be targeted for destructive sampling in the steps that follow.

Subsection (4) requires that at a minimum the first tree in each size class ranked in accordance with subsection (3) must be selected for destructive sampling.

Subsection (5) specifies the requirements if more than one tree per size class is needed to achieve the minimum sample size specified in section 3.17.

3.22 Step 8—Destructive sampling procedure

Section 3.22 sets out the procedure for destructive sampling.

Having selected biomass sample trees to develop or validate an allometric equation, the project proponent must undertake the task of cutting the trees down and cutting the trees into their respective components using the procedure in section 3.22.

The destructive sampling protocol in section 3.22 was adapted from:

- Walker, S, et al. (2012) *Standard Operating Procedures for Terrestrial Carbon Measurement: Version 2012*, Winrock International.

The sampling design and statistical analyses were adapted from:

- Snowdon, P. et al. (2002) NCAS Technical Report no.31: Protocol for Sampling Tree and Stand Biomass, Australian Greenhouse Office.
- Dietz, J. and Kuyah, S. (2011) *Guidelines for establishing regional allometric equations for biomass estimation through destructive sampling*. World Agroforestry Centre (ICRAF), United Nations Avenue, Gigiri.
- Picard, N, et al. (2012) *Manual for building tree volume and biomass allometric equations: from field measurements to prediction.* Food and Agricultural Organization of the United Nations, Rome and Centre de Coopération Internationale en Recherche Agronomique pour le Développement, Montpellier.

3.23 Step 9—Biomass analysis

Section 3.23 sets out the procedure for undertaking a biomass analysis in order to convert wet weight measurements into dry weight. The analysis is undertaken using the samples obtained in Step 8.

Subsection (1) specifies the process for calculating the whole tree dry to wet weight ratio. Paragraph (1)(b) requires that representative subsamples be collected for each tree component. Different components may require different procedures for determining what is representative. In relation to this requirement, proponents may wish to consult:

- Snowdon, P et al. (2002) NCAS Technical Report no.31: Protocol for Sampling Tree and Stand Biomass, Australian Greenhouse Office.

Subsections (4) and (5) detail the process for determining the coefficient of variation for dry:wet weight ratios in allometric equations for single species where not all trees were analysed for dry weight. The requirements for the treatment of samples where the coefficient exceeds 15 % are also specified.

Subsection (5) specifies the treatment of samples where the coefficient of variation for dry:wet weight ratios in allometric equations for single species is below 15%.

3.24 Step 10—Data exploration and analysis

Section 3.24 only applies to the development of new allometric equations.

Subsection (1) requires that the whole tree dry weight data obtained in section 3.23 must be compiled into a database or spreadsheet suitable for statistical analysis or importation into a statistical analysis software package.

Subsection (2) provides that to validate an existing allometric equation, subsection 3.24 does not apply, and the steps in Step 11 in section 3.25 must be completed instead.

Subsection (3) provides that section 3.24 is to be used when developing a new allometric equation.

Subsections (4) to (13) specify the detailed process for developing and testing the appropriateness of an allometric equation from the data obtained in section 3.22.

An allometric equation being developed must take the form of a statistical model fitted using:

- simple linear regression;
- multiple regression;
- polynomial regression; or
- non-linear regression.

Each allometric equation developed is required to satisfy the assumptions that the averages of the response variables change in a systematic way with variation in the predictor variable and that errors are statistically independent and normally distributed.

Applying a transformation to the data may be needed to satisfy the above assumptions. As logarithmic transformation introduces bias, this bias must be corrected. Therefore, subsection (8) provides that if a logarigthmic transformation is applied to the response variable, the proportional bias must be estimated and applied using the ratio of the arithmetic sample mean to the mean of the back-transformed predicted variables.

Proponents may wish to consult:

- Snowdon, P (1991) A ratio estimator for bias correction in logarithmic regressions. *Canadian Journal of Forest Research* 21, 720–724.

Subsection (13) provides that the mean of the weighted residuals calculated in Equation 1 must not be significantly different from zero, as determined by applying a two-tailed student t-test.

Subsection (14) provides that if the model satisfies the requirements of subsection (13), the model can progress to validation in Step 11 in section 3.25.

Subsection (15) requires that if the model does not satisfy subsection (13):

(a) an existing equation must be selected in accordance with section 3.13 and validated using the procedure outlined in section 3.25; or

(b) a new equation must be developed.

3.25 Step 11—Validation of allometric equation

Section 3.25 requires that the effectiveness of a model to predict biomass (or tree volume) must be validated by comparing its predictions to observations made using an independent dataset.

Subsections (1) and (2) provide that each allometric equation must be validated with respect to the applicable clearing consent mentioned in section 2.3. Each allometric equation must also be validated during the first reporting period and the last reporting period in the crediting period.

Each allometric equation to be applied in the project area must be validated in accordance with the process set out in the subsections summarised in the following steps:

Step 11.1—Confirmation of allometric domain

Subsections (3) to (7) set out the procedure for confirming the allometric domain of an equation to be validated.

Step 11.2—Predicted biomass of sample trees

The effect of subsections (8) and (9) is that 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 variable measurements collected from each test tree.

Step 11.3—Comparison between predicted and observed biomass

Subsections (10) to (12) set out the procedure for comparing the predictions of a model with the observations estimated by the destructive sampling of test trees selected in accordance with Step 3 in section 3.17.

Step 11.4—Minimum requirements for validation of allometric equations

Subsection (13) specifies the minimum requirements for validation of allometric equations.

3.26 Procedure if allometric equation cannot be validated

Section 3.26 sets out the procedure that must be followed if an allometric equation cannot be validated and requires that another equation be selected for validation in accordance with section 3.13 or that a new allometric equation be developed in accordance with section 3.24.

Subdivision 3.4.3 Biomass survey

3.27 Determination of native forest biomass

Section 3.27 provides that a field-based survey must be undertaken in order to determine the biomass stocks in the native forest in the project area. Biomass surveys must be carried out in the first reporting period for all CEAs. After this time, biomass surveys are only required for CEAs in which there is a disturbance. In the absence of a disturbance, project proponents can assume that biomass in the CEAs remains unchanged after the first reporting period. Alternatively, project proponents can choose to re-survey CEAs in order to detect increases in tree growth.

The steps detailed in Subdivision 3.4.3 must be followed for the initial assessment of biomass stocks and whenever a biomass survey is conducted to account for changes to carbon stocks during the project period.

3.28 Determination of root:shoot ratios

Section 3.28 determines the procedure for determining the root:shoot ratio for a Major Vegetation Group class. These root:shoot ratios are used to determine the below-ground biomass of trees in the project area. Root:shoot ratios are applied in Equation 8 and Equation 14.

3.29 Step 1—Plot design

Section 3.29 sets out the requirements for the plot design for a biomass survey. Due to the variety of forest ecosystems in Australia and the variable condition of the forest stand in the ecosystems, the method of determining a specific plot design should be based on maximising efficiency and minimising variance when determining the biomass content of CEAs.

Subsection (5) provides that if the plot is located on a slope greater than 10 degrees, then a correction must be applied in order to correct for the slope. In relation to this requirement, project proponents may wish to consult:

- Walker, S, et al. (2012) *Standard Operating Procedures for Terrestrial Carbon Measurement: Version 2012*, Winrock International.

3.30 Step 2—Allocation of plots

Section 3.30 sets out the procedure for allocating plot points to a CEA.

Subsections (1) to (3) provide for the identification of waypoints. A minimum of 200 waypoints must be assigned to each CEA. These represent the potential plot points that can be surveyed in the pilot survey, primary biomass survey and any additional surveys that are required to achieve the Targeted Precision. The actual number of plots to be surveyed is determined in Step 4 in section 3.32 and validated in Step 9 in section 3.37. However, this step is applied first in order to avoid multiple allocations of plot points.

Subsections (4) to (7) provide for allocation of plots using a method that is both random and replicable. Accordingly, project proponents must use a pseudo-random number generator with a defined seed number when allocating plots to CEAs. The final plot points become the waypoint of the plots. Potential plot points should be assigned a random number and then numerically sorted lowest to highest. The lowest ranked plot will become *plot 1* and the highest ranked will be the last ranked plot. For example, if 200 potential plot points are generated, the highest ranked would be *plot 200*. Project proponents must survey the required number of plots as estimated in Step 4.2 in section 3.32. For example, if on completion of Equation 6 the estimated number of plots is 50, project proponents must survey plots 1-50.

Subsection (8) provides that the project proponent must retain the area boundary used to allocate plots as provided by this section in order to enable the replication of the plot allocation using the defined seed number. This enables audits of the project area.

Subsection (9) lists attributes that must be assigned for each plot waypoint.

In all survey scenarios, project proponents must survey the allocated plots in numerical order according to the plot point number [PLOT_NUM].

3.31 Step 3—Pilot survey

Section 3.31 sets out the requirements for undertaking a pilot survey. The pilot survey is used to estimate the variation in biomass that is present within each CEA. While a minimum of five plots is required for the pilot study, project proponents may choose to measure more than this to improve the accuracy of the estimate of variation. An improved estimation of the variation will improve the efficiency of the biomass survey, and reduce the risk of over or under sampling.

The effect of subsection (3) is that data collected in the pilot survey may be included in the biomass survey.

3.32 Step 4—Number of plots

Section 3.32 sets out the procedure for determining the number of plots in the biomass survey using data collected in the pilot survey in Step 3 in section 3.31.

Step 4.1—Coefficient of variation of each carbon estimation area

Subsections (2) and (3) have the effect that project proponents must use the data obtained in the pilot survey in Step 3 to calculate the coefficient of variation of each CEA by completing Equation 5.

Step 4.2—Number of plots to sample in each carbon estimation area

Subsection (4) provides that, for the purposes of the Determination, native forest carbon stocks must be estimated within ±10% of the true value of the mean at a 90% confidence level.

Subsection (5) provides that the requirement in subsection (4) is referred to as the 'Targeted Precision'.

Subsection (6) provides that in order to estimate the required sample size to achieve the Targeted Precision in each CEA, project proponents must complete Equation 6.

3.33 Step 5—Preparation of biomass survey

Section 3.33 sets out the requirements project proponents must meet when preparing a biomass survey. These requirements are intended to ensure the accuracy of measurements and minimise error.

3.34 Step 6—Measurements within plots

Section 3.34 sets out the requirements for navigating to, establishing and undertaking measurements within plots.

The survey team must use a GPS device that that has an accuracy of ± 4 metres when navigating to each waypoint. When the survey team has navigated to the plot, it must establish the plot as detailed in Step 1 in section 3.29. Once the plot is established, specific measurements must be taken within the plot to accurately estimate plot biomass.

When measuring above-ground biomass within the plot, project proponents must measure the explanatory variable(s) required by the allometric equation that is to be used for each species or group of species that is found within the plot. This is often a stem diameter at some distance from the ground (for example Diameter at Breast Height (DBH) which is 1.3 metres from the ground) and can include height along with other independent variables required by the allometric equation.

No measurement is required for below-ground biomass as National Greenhouse Account default root:shoot ratios are applied.

3.35 Step 7—Biomass of plots

Subsection (1) provides that project proponents must determine the biomass of each plot surveyed as provided by Step 6 in section 3.34 by following Steps 7.1 to 7.4.

Step 7.1—Determination of above-ground biomass by applying allometry

Project proponents must have developed or validated all allometric equations used in the estimation of above-ground biomass in accordance with Subdivision 3.4.2—Allometric equations. Once this is complete, proponents must convert the measurements made in the field sample plots into the above-ground biomass stock estimates for each tree, using the allometric equation for the species or group of species.

Step 7.2—Determination of above-ground biomass in survey plots

Subsection (5) provides that project proponents must determine the above-ground biomass stock in survey plot (sp) in CEA (i) by completing Equation 7.

Step 7.3—Determination of below-ground tree biomass in survey plots

Subsection (6) provides that project proponents must determine the below-ground tree biomass in each plot surveyed as provided by Step 6 in section 3.34 by completing Equation 8.

Equation 8 requires the input of the appropriate root:shoot ratios, which are determined in accordance with section 3.28.

Step 7.4—Determination of total tree biomass in each plot

Subsection (7) provides that project proponents must determine the total tree biomass for each plot surveyed as provided by Step 6, section 3.34 by completing Equation 9.

3.36 Step 8—Edge corrections for plots crossing carbon estimation area boundaries

Section 3.36 sets out the steps for correcting the edge effects that occur when a plot crosses the boundary of a CEA.

An edge correction must be applied if a plot, once established, moves into one or more strata outside of the CEA that is being surveyed. If it is determined that a plot, once established, will span multiple strata, then the collection of biomass data within the plot will lead to an erroneous plot estimate.

Project proponents must omit the plot if more than 20% of the plot falls outside of the CEA that is to be surveyed.

For all other scenarios where plots have edge effects, project proponents must first use the mirage method to mirror the plot into the CEA that is being surveyed. Further details on implementing the mirage method can be found in:

- Beers, T.W. (1977) Practical correction of boundary overlap. *Southern Journal of Applied Forestry* 1, 16–18.

With circular plots, for example, the proponents would measure the distance from the plot centre to the edge of the CEA, then locate a second plot the same distance beyond the edge of the CEA. The proponent would then measure all trees located within the CEA as determined from the second plot, and allocate these measures to the first plot. The effect of this is that trees that fall in both the original and mirage plot will be measured twice.

3.37 Step 9—Validation of sample size

Subsection (1) provides that the project proponent must perform an ex-post analysis of the data obtained in the biomass survey in order to verify that the survey performed as provided by this Subdivision has achieved Targeted Precision.

Step 9.1—Standard error

Subsection (2) requires that project proponents must complete Equation 10 in order to determine the standard error.

Step 9.2—Determination of Targeted Precision

Subsection (3) provides that project proponents must complete Equation 11 in order to verify that the survey has achieved Targeted Precision.

Subsection (4) provides that project proponents must use the 90% confidence level when determining the t-value.

Subsection (5) provides that the final value of the Targeted Precision error limit of the primary biomass survey must be less than or equal to 10%.

Subdivision 3.4.4 Calculation of baseline emissions

3.38 Calculating baseline emissions

Emissions from the baseline are calculated once for the project, using data collected for the first reporting period. Once calculated, the baseline is set for the remainder of the crediting period. Section 3.38 explains that Subdivision 3.5.4 contains the steps to be followed for calculating the baseline emissions in the project area.

3.39 Baseline relevant carbon pools

Section 3.39 provides that carbon pools relevant to the baseline are limited to above-ground tree biomass, below-ground tree biomass, and the burning of biomass for clearing purposes.

3.40 Step 1—Surveying requirements

Section 3.40 explains that the first step for calculating the baseline emissions is to conduct a biomass survey according to the process outlined in Subdivision 3.4.3. This ensures that project proponents have accurate carbon stock data for their project area as a basis for which to conduct subsequent calculations.

3.41 Step 2—Calculating carbon stocks in carbon estimation area

Section 3.41 contains calculations that project proponents must complete in order to calculate carbon stocks in each CEA.

Step 2.1—Determine mean carbon stocks in each carbon estimation area

First, subsection 3.41(1) provides that Equation 12 must be used to estimate the mean carbon stock in all pools in each CEA. Under the Determination, it is conservatively assumed that the carbon stock at the time of the first offsets report is equivalent to the carbon stock prior to the planned deforestation. These forest carbon stocks represent the carbon stocks that would have been cleared in accordance with the deforestation plan. This same equation is used to estimate the carbon stocks for future reporting periods when a biomass survey is carried out.

Step 2.2—Non-project tree buffer

If the deforestation plan excludes certain trees in a CEA from being cleared, the biomass in these trees cannot contribute to estimates of abatement. For example, some deforestation plans may protect particular species or trees above a certain size from being cleared. To address this, subsections (3) and (4) provide that the 'non-project tree buffer' is calculated for each CEA using Equation 13. The result is the set proportion of biomass that is not at threat of being cleared. The non-project tree buffer is determined for each CEA at the beginning of the project and remains constant throughout the life of the project. It must be applied in assessing the project baseline and at all future assessments of tree biomass during the project period, including the monitoring of any biomass enhancement. In the circumstance that a new CEA is delineated as a result of a disturbance event, the non-project tree buffer of the original, un-delineated CEA must be used.

Step 2.3—Total biomass of non-project trees within each plot

Equation 14 calculates the total biomass of non-project trees in each plot by applying the non-project tree buffer.

3.42 Step 3—Calculating carbon stocks in carbon estimation area following clearing

Section 3.42 contains equations to calculate the long-term average carbon stock in each CEA that would have existed in the baseline following clearing as stated in Subsection (1).

Subsection (2) provides that Equation 15 is to be used to calculate the long-term average mean carbon stock in all pools in each CEA following clearing according to the deforestation plan. This represents the long-term average carbon stock that would have remained following deforestation, accounting for stock changes resulting from burning and decay of biomass. To complete Equation 15, Equations 16 to 20 must first be calculated.

Because the post-deforestation land use in the baseline is cropping or grazing, regrowth events are assumed to be continuously suppressed and so would be immaterial. Accordingly, the Determination limits baseline calculations to the degradation of the debris pool remaining after deforestation. This is calculated by determining the impact of any treatment on the debris pool after clearing and the decay of the residual biomass after treatment.

Step 3.1—100 year average of biomass within sample plots following clearing

Subsection (3) provides that project proponents must complete Equations 16 to 20 in order to determine the 100 year average biomass stock that would exist in the sample plots following clearing.

Step 3.1.1—Model biomass in debris pool

Subsection (4) provides that Equation 16 is used to calculate the biomass in the debris pool within each sample plot, post-deforestation in the baseline. All biomass subject to clearing, consistent with the National Inventory approach, is treated as moved to the debris pool following the clearing event; and therefore the biomass stock sampled within plots represents the biomass stock of the debris pool. Under the Determination, the non-project tree buffer is not applied for estimating the long-term carbon stocks. The effect of this is a conservative baseline.

Step 3.1.2—Partition of biomass into Major Vegetation Group tree components

In order to determine the impact of treatment (such as fire) and decay on each component of the tree, subsection (5) requires the biomass of each sample plot to be partitioned into its Major Vegetation Group tree components (stem, branch, bark, leaves, coarse roots and fine roots). Subsection (6) provides that biomass partitioning must be done in accordance with the yield allocations in Schedule 1. Subsection (7) provides that Equation 17 must be used to calculate the biomass of each tree component in each sample plot in order to determine the impact of treatment and decay on each component of the tree, using the applicable biomass fractions in Schedule 1.

Step 3.1.3—Treatment of the debris pool

Once the debris pool has been partitioned into the respective tree components, the debris pool is assumed to be treated by fire. Equation 18 must be completed to determine the biomass of each tree component after burning, using Schedule 1 for burn efficiency data. Where fire is not used as a treatment and the biomass is left to decay, this step can be omitted and decay modelled using Equation 19.

Step 3.1.4—Average long-term carbon stock of tree components

Once the biomass residue has been determined for each tree component in each plot (using Equations 18), the long-term average carbon stock (for each tree component in each plot), must be determined while accounting for decay. Equation 19 is to be used to calculate the 100 year average biomass of each tree component in each sample plot.

Step 3.1.5—Sum of average long-term carbon stock of each tree component

Subsection (10) provides that the long-term average biomass in each sample plot must then be calculated by using Equation 20, which sums the 100 year average biomass of each tree component in the sample plot (calculated in Equation 19).

3.43 Step 4—Calculating changes in baseline carbon stock in each carbon estimation area

Section 3.43 provides that the parameters obtained in sections 3.41 and 3.42 are to be used to complete Equation 21, which estimates the change in baseline carbon stocks during the crediting period as a result of the implementation of the deforestation plan.

3.44 Step 5—Calculation of emissions in each carbon estimation area in the baseline

Subsection (1) provides that project proponents must account for methane and nitrous oxide emissions released as a result of the burning.

Step 5.1—Pre-fire above-ground biomass stock

Subsection (1) specifies that the first step in this calculation is to determine the pre-fire above-ground biomass stock in each CEA that would have been burned. This is calculated from data collected from the biomass survey for the first reporting period. Subsection (2) provides that this is to be done using Equation 22.

Step 5.2—Determination of methane and nitrous oxide emissions from biomass burns

Subsection (3) provides that methane and nitrous oxide emissions from fire events are to be determined using Equation 23 (for methane) and Equation 24 (for nitrous oxide). These equations use the results obtained in Equation 22.

Step 5.3—Determination of greenhouse gas emissions from biomass burning

Having determined the methane and nitrous oxide emissions from biomass burning, greenhouse gas emissions from a biomass burning event must be calculated for each CEA by completing Equation 25, which sums the results of Equations 23 and 24. Equation 25 is also used when estimating emissions from a post-deforestation biomass burn in the project.

Subsection (5) redefines the output of Equation 25 to refer specifically to the baseline for each CEA.

3.45 Step 6—Calculating net baseline greenhouse gas emissions and removals

Section 3.45 provides that Equation 27 is to be used to calculate the net greenhouse gas emissions in the baseline. The results of Equations 21 and 26 are to be used as inputs in Equation 27.

Subdivision 3.4.5 Calculation of project emissions and removals

Subdivision 3.4.5 provides calculations to enable project proponents to calculate the net greenhouse gas emissions and removals arising from project activities. The output is the parameter $GHG_{NET\ P}$, which is used in Subdivision 3.4.6 to calculate net greenhouse gas abatement for the project.

3.46 Calculating project emissions and removals

Section 3.46 provides that project emissions must be calculated by following the steps in Subdivision 3.4.5. At the end of each reporting period, emissions data collected during the reporting period must be used for the equations in Subdivision 3.4.5. The Determination also provides a mechanism for proponents to account for any removals detected during the reporting period.

3.47 Project relevant carbon pools

Section 3.47 specifies the relevant carbon pools for the purposes of Subdivision 3.4.5. Relevant carbon pools are limited to:

- above-ground tree biomass;
- below-ground tree biomass;
- the combustion of fossil fuels in vehicles, machinery and equipment; and
- the burning of biomass in controlled burns.

3.48 Step 1—Project forest carbon stock changes in carbon estimation area resulting from disturbances

Section 3.48 provides calculations to determine emissions in areas where degradation or natural disturbance have been detected in a CEA or clearing buffer.

If disturbance is detected in a CEA (where 'disturbance' is defined in section 1.3 as degradation or a natural disturbance), then the CEA must be re-stratified by delineating a new CEA where the disturbance has occurred, in accordance with section 3.7. Subsections (1) to (5) provide instructions for calculating the mean carbon stock changes in a new CEA that has been created under section 3.6 due to a disturbance.

Instructions for calculating the biomass stocks in the new CEA after degradation or natural disturbance are contained in subsections (1) to (3). These subsections specify that project proponents can calculate the new biomass stocks by either re-surveying the new CEA in accordance with Subdivision 3.5.3, or by conservatively electing to set carbon stocks at zero in the deforested area. Re-surveyed CEAs must achieve the Targeted Precision.

After determining the carbon stocks remaining after the disturbance, project proponents must determine the mean carbon stock changes per hectare as a result of the disturbance in each affected CEA using Equation 28. The net carbon stock changes in all pools as a result of the disturbance must then be calculated using Equation 29. These equations specify that the net carbon stock changes within each CEA resulting from the disturbance are equal to the spatial extent of the disturbance event multiplied by the emissions from the event, represented by the change in carbon pools.

3.49 Step 2—Optional calculation of carbon stock enhancements

Section 3.49 specifies optional calculations to determine net carbon stock changes in each CEA as a result of forest carbon stock enhancement. Forest carbon stock enhancement may occur through both natural growth and human assisted growth in biomass stocks in a CEA. These calculations are optional as the omission of the calculations is conservative.

If project proponents wish to account for carbon stock enhancements, subsections (2) to (4) provide that to determine growth in biomass stocks, a complete biomass survey must be conducted at the end of each reporting period in the CEAs that undergo carbon stock enhancements. CEAs must be surveyed in accordance with Subdivision 3.5.3 and must achieve the Targeted Precision.

For each of the surveyed CEAs, the net carbon stock changes as a result of forest carbon stock enhancement are then calculated for the relevant reporting period using Equation 30.

3.50 Step 3—Calculating project emissions

Section 3.50 contains instructions for calculating the emissions resulting from fires in the project area and from the combustion of fossil fuels used in the project.

Calculations to determine emissions from fires in the project area are specified in subsections (2) and (3).

Subsection (2) provides that the biomass burnt by fires in each CEA for a reporting period must be calculated using Equation 31, which requires project proponents to determine the area burned and the fire type. The burn efficiency factor in this equation adjusts the biomass burnt according to fire type (wildfire or controlled burn), recognising that the mass of biomass burnt varies with different types of fire.

Subsection (3) provides that the mass of biomass burned in each CEA (calculated in Equation 31) must be used to calculate the methane and nitrous oxide emissions associated with each fire event in each CEA. Emissions are to be calculated using Equation 32 (for methane emissions) and Equation 33 (for nitrous oxide emissions). These emissions must then be summed in Equation 34 to determine total emissions due to fire events in the CEA. Section 3.48 accounts for any changes in carbon stocks as a result of a fire.

Calculations to determine emissions from fuel use in the project are specified in subsections (4) and (5). Subsection (4) provides that net total emissions of fuel consumption during a reporting period must be calculated for each CEA using Equation 35. This equation sums the results of Equation 36 in subsection (5), which provides that the emissions of each greenhouse gas (carbon dioxide, methane and nitrous oxide) must be separately calculated for each fuel type (diesel, gasoline, etc.) for fuel used for each CEA during the reporting period.

Subsection (6) provides that total greenhouse gas emissions for the project during a reporting period are to be calculated using Equation 37. This equation sums the emissions from fossil fuel combustion calculated using Equation 35 and the emissions from biomass burnt due to fires in the reporting period calculated using Equation 36.

3.51 Step 4—Calculating total net greenhouse gas project emissions for reporting period and crediting period

Section 3.51 specifies that the total net greenhouse gas project emissions for the project in a reporting period are to be calculated using Equation 38.

Equation 38 requires total net greenhouse gas emissions to be calculated for each CEA for each reporting period, and then requires these results to be summed to determine total net project emissions across all reporting periods. Total net greenhouse gas emissions for each CEA are calculated as the sum of all net carbon stock changes as a result of degradation and natural disturbance (calculated in Equations 28 and 29), plus the total greenhouse gas emissions from fire and fuel use (calculated in Equation 37), less the net carbon stock change as a result of forest carbon stock enhancement (calculated in Equation 30).

Subdivision 3.4.6 Calculating net greenhouse gas abatement

Subdivision 3.4.6 specifies calculations to determine the project's Net Sequestration Number for the crediting period. It specifies that net abatement for the crediting period equals the abatement achieved at the end of the current reporting period (determined using Equation 39), adjusted using Equation 40 to account for changes in carbon stocks during the crediting period. The effect of this is that the rate of crediting will change if there is an increase in emissions or removals during a reporting period.

Part 4 Monitoring, record-keeping and reporting requirements

Division 4.1 General

4.1 Application

Section 4.1 provides that the project proponent of an eligible offsets project to which the Determination applies must comply with the monitoring, record-keeping and reporting requirements specified in Part 4.

Division 4.2 Monitoring Requirements

4.2 Monitoring for disturbance

Subsection (1) provides that the project area must be monitored for disturbances during the reporting periods.

Subsections (2) and (3) specify that monitoring is undertaken through land cover assessments with remotely sensed imagery.

Division 4.3 Record-keeping requirements

4.3 Information relating to project area and land-cover assessment

Section 4.3 provides that records must be kept in relation to the project area and any land cover assessment undertaken in accordance with section 3.3.

4.4 Information relating to project eligibility

Section 4.7 provides that records must be kept in relation to each of the evidentiary requirements set out in section 2.4.

4.5 Information relating to remotely sensed imagery

Section 4.8 provides that records must be kept in relation to each of the requirements for remotely sensed imagery set out in section 3.2.

4.6 Information relating to biomass survey report

Subsection (1) specifies the records that must be kept in relation to undertaking a biomass survey, including plot design, number of plots estimated, method for establishing plots and the plot data measured.

Subsection (2) provides that in relation to the number of plots estimated, the data collected in sections 3.31 and 3.32 must be compiled in a spread sheet which also demonstrates the validation calculation specified in section 3.37.

Subsection (4) provides that, in relation to the process or method for the calibration of all survey equipment requiring calibration, the project records may include documentation of the calibration process and documentation of calibration dates signed by the field leader.

4.7 Information relating to allometric equations

Subsection (1) provides that records must be kept in relation to each allometric equation used to estimate above-ground biomass.

Subsection (2) specifies in detail the individual record elements that must be kept for each allometric equation used to estimate above-ground biomass.

4.8 Information relating to emissions and abatement calculations

Subsection (1) provides that all data required for the calculations in Subdivisions 3.4.4, 3.4.5 and 3.4.6 must be recorded.

Subsection (2) provides that the data identified in subsection (1) must be kept for 10 years after it is submitted with an offsets report.

Division 4.4 Offsets report requirements

4.9 Information that must be included in the first offsets report

Section 4.9 sets out the information that must be included in the first offsets report submitted for the project. This is general information that relates to verifying the baseline. General information that must be contained in all offsets reports is set out in section 4.10.

4.10 Information that must be included in all offsets reports

Paragraph 6.2(j) of the Regulations requires that an offsets report must set out any information that has to be submitted in the report under the applicable methodology determination.

Section 4.10 sets out the information that must be submitted in all offsets reports for the project. This includes the first and all subsequent reports.

Schedule 1 Partitioning of Biomass

Schedule 1 provides four tables which specify numeric values for the partitioning of biomass, burn efficiency and decay rates. The values are used as specified input values for the equations in Subdivisions 3.4.4, 3.4.5 and 3.4.6.

Attachment B

Statement of Compatibility with Human Rights

Prepared in accordance with Part 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*

Carbon Credits (Carbon Farming Initiative) (Avoided Deforestation) Methodology Determination 2013

This legislative instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Overview of the Legislative Instrument

The *Carbon Credits (Carbon Farming Initiative) (Avoided Deforestation) Methodology Determination 2013* (the Determination) sets out the detailed rules for implementing and monitoring an eligible Carbon Farming Initiative native forest protection project. The *Carbon Credits (Carbon Farming Initiative) Act 2011* (the Act) provides that a native forest protection project is a project to: (a) remove carbon dioxide from the atmosphere by sequestering carbon in trees in one or more native forests; and (b) avoid emissions of greenhouse gases attributable to the clearing or clear-felling of one or more native forests.

The Determination applies to a native forest that may be cleared for conversion into cropland or grassland. Abatement is achieved by not clearing the native forest and thereby avoiding the emissions that clearing would have produced. Additional abatement may be achieved by managing the native forest in a way that enhances carbon stocks. The way in which abatement and sequestration are credited is set out in Division 3.4.

Project proponents wishing to implement the Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements set out under the *Carbon Credits (Carbon Farming Initiative) Act 2011*. Offsets projects that are approved by the Regulator can generate Australian carbon credit units that can be sold to:

- Australian companies that pay the carbon price established under the *Clean Energy Act 2011*; or
- businesses in Australia wanting to offset their own carbon pollution.

Human rights implications

This legislative instrument does not engage any of the applicable rights or freedoms.

Conclusion

This legislative instrument is compatible with human rights as it does not raise any human rights issues.

Yvette D'Ath, Parliamentary Secretary for Climate Change, Industry and Innovation