

EXPLANATORY STATEMENT

Issued by the Authority of the Minister for the Environment

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Credits (Carbon Farming Initiative—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015

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 either by reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or vegetation.

Carbon sequestration and emissions reduction 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 methodology determination. The purpose of a methodology determination is to establish procedures for estimating abatement (emissions reductions and sequestration) and rules for monitoring, record keeping and reporting.

Offsets projects that are undertaken in accordance with methodology determinations and approved by the Clean Energy Regulator (the Regulator) can generate Australian carbon credit units.

In 2014 the Australian Government established the Emissions Reduction Fund (ERF). The ERF has three elements: crediting emissions reductions, purchasing emissions reductions, and safeguarding emissions reductions. Project proponents may receive funding from the ERF by submitting their projects into a competitive auction run by the Regulator. The Government will enter into contracts with successful proponents, which will guarantee the price and payment schedule for the future delivery of emissions reductions.

Background: Soil Carbon

Soil carbon is primarily made up of decomposing plant material and microbes. Carbon rich materials, such as the roots, stems and leaves of crops or pasture grasses, cycles into the soil where part of it is broken down and respired into the atmosphere as carbon dioxide, while some remains to form soil carbon. Soil carbon levels can be improved by increasing the amount of carbon added to the soil and/or reducing the amount of carbon removed from the soil.

Since native vegetation cover has changed or disappeared, soil carbon levels in Australian agricultural soils have typically experienced substantial declines. Most agricultural soils are either still losing soil carbon or have stabilised at a new, lower, level. In many cases this means that there are opportunities to improve soil carbon stocks either by increasing the absolute level of soil carbon, or by slowing the rate of loss of carbon from the soil.

The determination builds upon the Carbon Farming Initiative soil carbon sequestration methodology determination known as the *Carbon Credits (Carbon Farming Initiative) (Sequestering Carbon in Soils in Grazing Systems) Methodology Determination 2014* (the CFI determination). The CFI determination applies to projects in grazing systems where changes in soil carbon stocks are estimated through direct measurement, whereas the determination uses default soil carbon enhancement values. Together the two determinations offer proponents the ability to select the approach that best suits the circumstances of their project.

The default values were derived from inventory systems used to prepare the Australian Government's annual submission under the United Nations Framework Convention on Climate Change and documented in the Australian Government's National Inventory Report. The National Inventory Report is published and made available on the Department's website. The Government uses Australia's National Inventory System soil carbon model, known as the Full Carbon Accounting Model (FullCAM), to generate estimates for changes in soil carbon stocks for agricultural systems. FullCAM is used to estimate the effect on soil carbon levels of increasing inputs of biomass to, or reducing removals of biomass from, agricultural soils. FullCAM includes data on soil types (clay-content and soil carbon) and climate (temperature, rainfall). FullCAM also incorporates survey data on management practices in use at the Statistical Area level 2 (SA2), as collected by the Australian Bureau of Statistics. The SA2 regions are standardised regions defined by the Australian Bureau of Statistics and vary in size as they are based on population density.

In developing the determination the Department of the Environment undertook a modelling exercise using FullCAM to estimate the effect of certain management interventions that would be likely to improve soil carbon stocks relative to a business as usual (BAU) scenario. These management interventions included: changing from annual cropping to pasture, retaining stubble in field, and increasing biomass yields (sustainable intensification) through inputs such as fertiliser, lime and water.

Each of these management interventions has the potential either to increase the amount of carbon added to the soil, or to reduce the amount of carbon removed from the soil. For example, where a paddock is significantly deficient in one or more nutrients then crop yield will be limited. Overcoming this deficiency by applying the right nutrients in the right manner can significantly improve the amount of plant matter grown and, hence, returned to the soil.

The management interventions were modelled across an area defined as croplands in the National Inventory, which is based on the definitions used in the ABARES Catchment Scale Land Use of Australia 2014 (version 5) and includes approximately 34 million hectares. For each management intervention included in the determination, two scenarios were modelled representing BAU management actions and an alternative scenario which assumes the management interventions have been implemented (that is, the project scenario). The difference in the carbon values between the two scenarios represents the sequestration value delivered as a result of the change in management practices. The modelled sequestration value was aggregated within each SA2 to provide a representative, default value, which is uniformly available for all sites within a SA2. It should be noted that, as these default sequestration values represent a change relative to BAU, they include the effect of both absolute increases in soil carbon and also avoided losses of soil carbon.

As a result of the modelling exercise SA2s have been grouped into four broad categories for each management action:

- High sequestration value
- Medium sequestration value
- Low sequestration value; and
- No value due to not being classified as ‘cropland’.

The default sequestration values are presented in the CFI Mapping Tool, which potential proponents can use to determine the abatement potential for undertaking an ERF project under the determination.

Sequestration projects covered by the determination are referred to in the determination as ‘soil carbon projects’. To be an eligible offsets project, a soil carbon project must undertake one of three ‘project management activities’ under which specified ‘management actions’ must be carried out. These project management activities are based on the FullCAM modelling used to derive the default values.

The project management activities covered by the determination are:

- (a) sustainable intensification, requiring management actions such as nutrient management, new irrigation, managing soil acidity or pasture renovation;
- (b) stubble retention, where crop residue that was previously removed through burning or baling is retained in field; and
- (c) conversion to pasture, where land under continuous cropping is permanently converted to pasture.

A project proponent wishing to implement the determination must make an application to the Regulator under section 22 of the Act to have the project declared as an eligible offsets project. To be declared eligible, the project must satisfy the criteria for declaration set out in subsection 27(4) of the Act. These criteria include compliance with the rules set out in the determination, and the ‘additionality’ requirements specified in subsection 27(4A) of the Act.

It is a requirement of the Act that ERF projects are ‘additional’, or new. The ‘additionality’ requirements that help ensure this fundamental requirement of the ERF are:

- (a) the newness requirement;
- (b) the regulatory additionality requirement; and
- (c) the government program requirement.

The government program requirement is provided for in the *Carbon Credits (Carbon Farming Initiative) Rule 2015*. Subsection 27(4A) of the Act provides that a methodology determination may specify requirements in lieu of the newness requirement or the regulatory additionality requirement.

The regulatory additionality requirement specified in the Act applies to projects covered by the determination.

The determination does, however, specify requirements in lieu of the newness requirement. The purpose of the specified requirements is to ensure that the assessment of newness disregards any written strategy that may be used to implement a project management activity but that is prepared before the activity begins.

As they are sequestration offsets projects under section 54 of the Act, proponents of soil carbon projects may select either a 100-year or 25-year permanence period. Projects are also subject to a risk of reversal buffer, as provided by section 16 of the Act.

Application of the determination

The determination sets out the detailed rules for implementing and monitoring offsets projects that sequester carbon in agricultural soils using certain types of management actions on project land.

Public consultation

The determination has been developed by the Department in consultation with the Regulator and in accordance with advice from technical experts in the field of soil carbon.

The technical experts held multiple meetings in 2015 and reviewed several draft versions of the determination.

The exposure draft of the determination was published on the Department's website at www.environment.gov.au for public consultation from 15 November 2014 to 12 December 2014. Eleven submissions were received. Details of the non-confidential submissions are provided on the Department's website.

Determination details

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

For the purpose of subsections 106(4), (4A) and (4B) of the Act, in making the determination the Minister has had regard to, and agrees with, the advice of the Emissions Reduction Assurance Committee that the determination complies with the offsets integrity standards and that the determination should be made. The Minister is satisfied that the carbon abatement used in ascertaining the carbon dioxide equivalent net abatement amount for a project is eligible carbon abatement from the project. The Minister also had regard to whether any adverse environmental, economic or social impacts are likely to arise from the carrying out of the kind of project to which the determination applies.

The determination commences on the day after it is registered on the Federal Register of Legislative Instruments (FRLI).

The determination expires when it is either revoked under section 123 of the Act, or on the day before it would otherwise be repealed under the *Legislative Instruments Act 2003*, whichever happens first. Under subsection 50(1) of that Act, a legislative instrument such as the determination is repealed on the first 1 April or 1 October falling on or after the tenth anniversary of registration of the instrument on FRLI. For example, if the determination is registered before 1 October 2015, it would expire on 30 September 2025.

Details of the determination are at [Attachment A](#).

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

Details of the Methodology Determination

Part 1—Preliminary

1 Name of determination

Section 1 sets out the full name of the determination, which is the *Carbon Credits (Carbon Farming Initiative—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015*.

2 Commencement

Section 2 provides that the determination begins on the day after it is registered on the Federal Register of Legislative Instruments (FRLI). For example, if the determination is registered on FRLI on 1 August 2015, it would take effect from 12.01am on 2 August 2015.

3 Authority

Section 3 provides that the determination is made under subsection 106(1) of the Act.

Subsection 106(1) of the Act provides that the Minister may, by legislative instrument, make a certain type of determination. Subsection 106(2) of the Act specifies that the determination is to be known as a **methodology determination**.

4 Duration

Under subparagraph 122(1)(b)(i) of the Act, a methodology determination remains in force for the period specified in the methodology determination.

The determination is in effect from the time it commences (as specified in section 2), until the day it would otherwise be repealed under subsection 50(1) of the *Legislative Instruments Act 2003*.

Instruments are repealed under that provision on the first ‘1 April’ or ‘1 October’ following the tenth anniversary of the instrument’s registration on FRLI. Section 4 of the determination ensures that the determination will expire in accordance with subparagraph 122(1)(b)(i) of the Act.

If the determination expires or is revoked during a crediting period for a project to which the determination applies, the determination will continue to apply to the project during the remainder of the crediting period under subsections 125(2) and 127(2) of the Act.

In general, project proponents may apply to the Regulator during a reporting period to have a different methodology determination apply to their projects from the start of that reporting period (see subsection 128(1) of the Act).

5 Definitions

Section 5 defines a number of terms used in the determination.

The following information should be noted about certain defined terms in the determination:

forest land—trees must be at least 2 metres high for the land to be ‘forest land’ under the determination.

material deficiency means a concentration of one or more nutrients in the soil that limits plant growth to 70% or less of either the water limited yield potential or water limited potential

annual pasture growth that could otherwise have been achieved. Material deficiency is not limited to a concentration of nutrient(s) that is sufficiently *low* that it achieves the result specified in the definition. Plant growth may be limited due to a low concentration of one or more nutrients or an imbalance of nutrients.

non-synthetic fertiliser—the definition of ‘non-synthetic fertiliser’ limits the use of certain types of non-synthetic fertiliser in a soil carbon project. Some fertilisers that may be used as part of a soil carbon project may contain both non-synthetic and synthetic components.

The determination restricts the use of non-synthetic fertilisers that include crop residue, hay or straw because removing biomass from an area can potentially reduce soil organic carbon stocks, reducing the net environmental benefit from the project. This potential leakage risk does not arise where that crop residue, hay or straw would have been removed from an area under BAU. For example, composts made using straw that was first used as poultry bedding would be eligible as the straw was been removed from the paddock in which it originally grew for reasons unrelated to the project. In this situation it can be assumed that the project has not caused a decrease of soil organic carbon stocks through the removal of biomass.

nutrient—only the four listed elements are relevant to the determination.

The note at the end of section 5 lists terms that are not defined in the determination but instead have the meaning given to them by section 5 of the Act.

References in the determination to ‘the Department’ are references to the department that is administered by the Minister administering the Act. When the determination commenced this was the Department of the Environment.

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.

6 Appropriate testing

Section 6 sets out the meaning of the term ‘appropriate testing’. Appropriate testing is relevant to management actions such as nutrient management or soil acidity management.

The type of testing required will vary depending upon location of the site, production system economics and management history. Moreover, industry practices are constantly evolving to reflect new science and the refinement of best practice. For these reasons, the determination neither prescribes a particular form of testing nor requires that the testing be carried out by a qualified person. The determination does, however, require that the testing be conducted in accordance with industry best practice and for the analysis to be carried out by qualified laboratories.

7 Factors and parameters from external sources

Section 7 refers to factors or parameters used in calculations that are derived from external sources. Most parameters are derived from the CFI Mapping Tool, the ‘Standard Parameters and Emissions Factors for the *Carbon Credits (Carbon Farming Initiative—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015*’ (Standard Parameters and Emission Factors), the *National Greenhouse and Energy Reporting Regulations 2008* (NGER Regulations), or the *National Greenhouse and Energy Reporting (Measurement) Determination 2008* (NGER Measurement Determination) which is made under subsection 10(3) of the *National Greenhouse & Energy Reporting Act 2007* (NGER Act).

The effect of subsection (1) is that if those legislative instruments are amended during a project's reporting period, then the project proponent will be required to use the factor or parameter prescribed in the instrument that is in force at the end of the reporting period.

Paragraph (2)(a) provides that subsection (1) does not apply if the determination sets out other requirements.

Paragraph (2)(b) provides that subsection (1) does not apply where it is not possible to apply retrospectively a factor or parameter in an instrument that is in force at the end of the reporting period. An example of circumstances where this may occur is where the monitoring approach defined in an external source is amended to require additional or different monitoring practices after the reporting period has commenced. In this circumstance it is not possible to undertake monitoring activities retrospectively in accordance with the new requirement.

As provided for by section 10 of the *Acts Interpretation Act 1901* and section 13 of the *Legislative Instruments Act 2003*, references to external documents which are legislative instruments (such as the NGER Measurement Determination) are to versions of those instruments as in force from time to time. In circumstances where paragraph (2)(b) of the determination applies, it is expected that project proponents will use the version of legislative instruments in force at the time at which monitoring or other actions were conducted. Section 94 of the determination sets out reporting requirements to be followed when paragraph (2)(b) applies.

Part 2—Soil carbon projects

8 Soil carbon projects

The effect of paragraphs 27(4)(b) and 106(1)(a) of the Act is that a project must be covered by a methodology determination, and that the methodology determination must specify the kind of offsets project to which it applies.

Section 8 of the determination sets out the kind of project to which it applies. Subsection 8(2) clarifies that this kind of project is known as a *soil carbon project*.

To be an eligible offsets project, a soil carbon project must be divided into carbon estimation areas on each of which one of three project management activities must be undertaken. For each project management activity specified management actions must be carried out. Different project management activities and management actions have different requirements. Some can be carried out only on land that is under pasture, some can be carried out only on land that is under crops and others can be carried out on either type of land.

Sequestration arising from each project type is estimated using the values provided in the CFI Mapping Tool. This tool is published and made available on the following website: <http://ncat.climatechange.gov.au/cmt/#/Home>. The values in the tool were derived through modelling undertaken by the Government using FullCAM and the parameters used to generate National Inventory reports for agricultural systems.

Soil carbon projects must also account for the effect of changes in emissions from other sources such as livestock, fertiliser, lime, irrigation energy use and residues in estimating net abatement from the project. These calculations use factors and approaches derived from the National Inventory Report.

The effect of paragraph 8(1)(c) is that a project cannot be declared as an eligible offsets project under the determination if the project is already declared under the CFI determination and is still ongoing. This is because the two determinations use different ways of calculating sequestration values. Although there is some limited overlap of activities, the ways of establishing additionality and baselines is different. Furthermore, each determination has policy mechanisms, such as managing for environmental variability, that are specific to the determination and effective over the long run. The combined effect of issues such as these means it is not possible to move from the CFI determination to the determination within a project. Paragraph 8(1)(c) does not, however, prevent a proponent ceasing or ‘deregistering’ a project under the CFI determination and starting a new project under the determination.

9 Project management activities in soil carbon projects

Section 9 specifies the different project management activities carried out in soil carbon projects.

The project management activity should accord with the land use type; that is, whether the land is under crops or pasture. For example, stubble retention may only be undertaken on land under crops. Conversion to pasture may only be undertaken on land under crops and, once converted, the land must be maintained as pasture. However, under sustainable intensification, land may change from crops to pasture as part of traditional rotations under a mixed farm. For example, one carbon estimation area may have crops for three years and pasture for two years. More detail on the eligibility for each project type is in Part 3. More detail on changing or ceasing activities is in Part 4.

Paragraph 9(1)(a) specifies the project management activity referred to in the determination as ‘sustainable intensification’. This type of management activity involves implementing any two of the following management actions specified in subsection 9(2):

- (a) nutrient management;
- (b) soil acidity management;
- (c) new irrigation;
- (d) pasture renovation.

Sustainable intensification involving nutrient management, managing soil acidity and/or new irrigation may be carried out on land that is under either pasture or crops, or land that switches between pasture and crops over time. Pasture renovation, however, may be carried out as a management action only on land that is under pasture.

Paragraph 9(1)(b) specifies the type of project management activity referred to in the determination as ‘stubble retention’. As set out in subsection 9(3), this type of project management activity applies to land that is under crops where crop residues (stubble) were historically removed through burning or baling. The project management activity involves undertaking the management action of ceasing routinely to burn or bale after harvesting a crop in a carbon estimation area, thereby retaining the crop residues that would have been removed under a BAU scenario in field.

Paragraph 9(1)(c) specifies the type of project management activity referred to in the determination as ‘conversion to pasture’. As set out in subsection 9(4), this type of project management activity involves undertaking the management action of establishing pasture by seeding in a carbon estimation area. This involves converting land from continuous cropping, including bare fallow, to permanent pasture by seeding. The land must then be maintained as pasture for the duration of the nominated permanence period.

Part 3—Eligibility requirements

Division 1—Eligible projects

10 Operation of this Part

The Act establishes general requirements for eligible projects, including the Regulator’s role in declaring an eligible project.

Under paragraph 106(1)(b) of the Act, requirements that a project must meet in order to be an eligible offsets project may be specified in a methodology determination.

Under paragraph 27(4)(c) of the Act, the Regulator must not declare that a project is an eligible offsets project unless the Regulator is satisfied that the project meets the requirements specified in the applicable determination.

Division 2—Requirements for declaration as eligible project

Division 2 of Part 3 of the determination sets out a number of requirements to be met in order for a project to be declared an eligible offsets project. These requirements deal with:

- the type of land on which the project management activities may take place;
- how the land may be stratified into one or more carbon estimation areas; and
- material that needs to be provided to the Regulator when applying for declaration as an eligible offsets project. This material may also have to be provided when applying to vary a project area.

Subdivision 1—Land on which the project is carried out

11 Location

Section 11 specifies where projects to which the determination applies must be located.

The effect of section 11 is that projects must be located within Australia, but not in external territories such as Christmas Island and Norfolk Island. These territories are excluded from the application of the determination because the assumptions underpinning the modelling exercise from which the sequestration estimates were derived apply only to mainland Australia and Tasmania.

12 Eligible land

Subsection 12(1) provides that a project area must be entirely made up of eligible land.

Subsection 12(2) provides that, to be eligible land under the determination, the land on which the project takes place must have a sequestration value determined using the CFI Mapping Tool. The soil carbon maps in the CFI Mapping Tool reflect land that was modelled using the National Inventory accounting tool FullCAM (cropland). Land that was not modelled does not have a sequestration value.

The effect of section 12 is that the project must take place on land that is eligible land. This means the project cannot be carried out on land that is not eligible land under section 12.

Subdivision 2—Carbon estimation areas

13 Carbon estimation areas—stratification

Subsection 13(1) provides that when applying for declaration as an eligible offsets project under section 22 of the Act, or applying to vary the project area (as provided for under section 29 of the Act), the project proponent must stratify the land on which the project will be carried out into at least one carbon estimation area. ‘Carbon estimation area’ is defined in section 5 as an area of land:

- (a) that is within the project area; and
- (b) on which a specific project management activity and management actions are carried out under the determination.

The number of carbon estimation areas into which a project area may be stratified is not limited. A project area may consist of as few as one carbon estimation area.

Some methodology determinations require stratification to occur after the project has started and before the submission of the first offsets report. The determination, however, requires at least some stratification to be undertaken before the application for declaration as an eligible offsets project is submitted. This is because many aspects of project eligibility are assessed according to the management history and characteristics of each carbon estimation area rather than for a project area as a whole.

Subsection 13(2) provides that land that does not fall within a carbon estimation area may be stratified into one or more exclusion areas. This is not, however, mandatory. Exclusion areas do not have to be shown on the map the proponent must provide to the Regulator under subsection 15(4).

Proponents may re-stratify a project area by changing the boundaries of existing carbon estimation areas and exclusion areas, adding new carbon estimation areas or exclusion areas and/or removing existing carbon estimation areas and exclusion areas. Some re-calculation of total project sequestration and consideration of depletion events may, however, be required.

14 Carbon estimation areas—general requirements

Paragraph 14(1)(a) provides that at least once during the baseline emissions period one of the following must have occurred on land in a carbon estimation area:

- (a) crops were grown;
- (b) livestock was grazed;
- (c) the land was bare fallowed.

This requirement ensures that projects take place on land that has recently been used for agricultural purposes as this was a key assumption used to model the effect of the project management activities on soil carbon stocks.

Paragraph 14(1)(b) provides that the carbon estimation area must consist entirely of land within a single SA2 region. SA2, or Statistical Area level 2, regions are standardised regions defined by the Australian Bureau of Statistics. They vary in size as they are based on population density. FullCAM incorporates survey data on management practices in use at the SA2 level.

If a project area covers multiple SA2 regions, the requirement in paragraph 14(1)(b) ensures that a single value is provided for each carbon estimation area.

Subsection 14(2) specifies various types of land that may occur on eligible land, but cannot be included in a carbon estimation area. These types of land must be excluded from a carbon estimation area as their inclusion would increase the risk of adverse environmental or carbon outcomes. For example, if projects could be undertaken on land that had recently been cleared then credits could potentially be issued for sequestration activities without considering the loss of carbon previously stored in woody biomass on the project area.

Paragraph 14(2)(b) refers to areas with organosols. This type of soil is also known as histosols. Further information about organosols, including a map of distribution, is available at: www.clw.csiro.au/aclep/asc_re_on_line/or/orgasols.htm.

Paragraph 14(2)(c) refers to ‘settlements including dwellings or other structures’. This includes single dwellings or buildings. The land on which such structures are situated must not be included in a carbon estimation area.

Paragraph 14(2)(e) refers to land on which a project management activity could not be carried out. This may include roads or waterways.

The proponent may stratify land listed in subsection 14(2) as an exclusion area.

Subsection 14(3) provides that, when applying for declaration as an eligible offsets project under section 22 of the Act, or applying to vary the project area (as provided for under section 29 of the Act), a project proponent must nominate a project management activity for each carbon estimation area. If there are more than one carbon estimation areas in a project area, each carbon estimation area may have a different project management activity.

The effect of subsection 14(3) is that only one project management activity can be carried out in a carbon estimation area at any point in time.

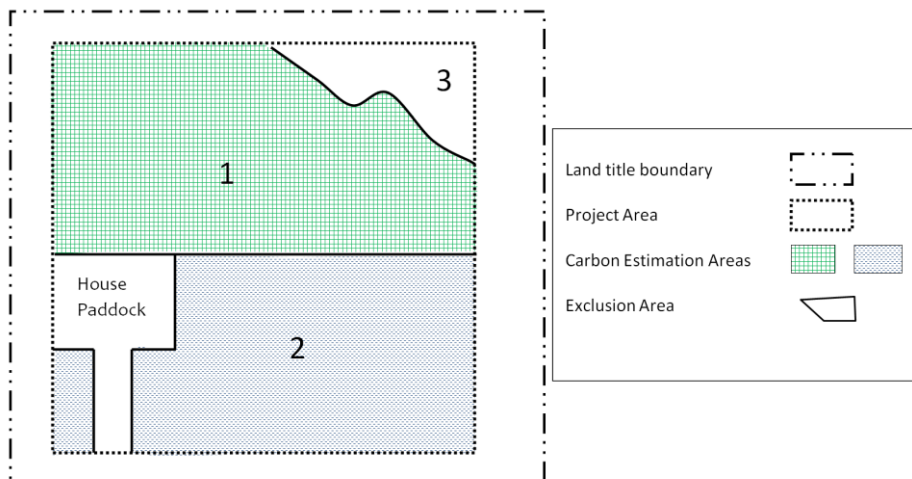
15 Carbon estimation areas—boundaries and mapping

Section 15 sets out the requirements for stratifying a carbon estimation area.

Subsection 15(1) provides that a carbon estimation area may consist of a single area of land or separate areas of land.

For example, it does not matter that a carbon estimation area is ‘split’ by an area the carbon stock of which is not modelled, so long as this area is not included in the total area of the carbon estimation area. This is illustrated in Figure 1.

Figure 1



Subsection 15(4) provides that the project proponent must give the Regulator a map showing each carbon estimation area in a project area. Provided that each carbon estimation area is shown, the map may be the same map that is given under subsection 13(2) of the *Carbon Credits (Carbon Farming Initiative) Rule 2015* (legislative rules), which provides that the applications for area-based offsets projects must be accompanied by a geospatial map that meets the requirements of the CFI Mapping Guidelines. These Guidelines are available at: www.environment.gov.au/node/37155.

A proponent may, but is not required to, show exclusion areas on the map.

16 Change of carbon estimation areas

The number or boundaries of carbon estimation areas may be changed during the project at the end of a reporting period.

Subsection 16(1) specifies the requirements in Subdivision 2 of Division 2 of Part 3 that the changed or added carbon estimation areas must meet.

Note 1 to subsection 16(1) reminds proponents that changes to carbon estimation areas must be detailed in the next offsets report.

Subsection 16(2) refers to carbon estimation area requirements that a proponent must meet when making an application for declaration of the project. The purpose of subsection 16(2) is to ensure that the proponent must also meet these requirements when changes are made to carbon estimation area numbers or boundaries after the project has commenced.

Subsection 16(3) specifies that changes to the number or boundaries of carbon estimation areas cannot result in land that was both in a carbon estimation area and reported on being removed entirely from a carbon estimation area in a project area. This is because any carbon sequestered in soil needs to be maintained for the nominated permanence period.

A consequence of subsection 16(3) is that a carbon estimation area that has been reported on may only be reduced in size if the excised portion is included in another carbon estimation area and thus continues to be subject to the determination.

Subsection 16(3) does not prevent a portion of a carbon estimation area being excised before the first report on the carbon estimation area is submitted. This is because no credits will have been issued for that carbon estimation area before the first report.

Subsection 16(4) specifies that the boundaries of a carbon estimation area must not be changed during a reporting period. The changes to the carbon estimation area boundaries should take effect at the start of the next reporting period. This is because the carbon estimation area is the basis for undertaking sequestration calculations under the determination. The sequestration calculations do not cover carbon estimation areas whose boundaries have changed part way through a reporting period.

Subdivision 3—Sustainable intensification

Subdivision 3 sets out matters that must be provided to the Regulator before undertaking sustainable intensification in a soil carbon project. Each of the four sustainable intensification management actions represents a management intervention that could overcome a potential limitation to plant production and that could therefore sequester soil carbon.

17 Sustainable intensification—general requirement

Section 17 specifies the management actions that may be carried out in a carbon estimation area as part of sustainable intensification.

The proponent is required to nominate two of the specified activities before undertaking the project management activity.

Two management actions are required for this project management activity because the sequestration value modelled by FullCAM is based on the assumption that management interventions result in an average biomass increase of 20% (comprising both above and below ground components). The determination is based on the premise that two management actions will result in approximately this increase in biomass production on average across a representative sample of project sites. This premise was corroborated by independent expert advice and is further supported by the financial incentive for proponents to maximise productivity to offset the costs of implementing the management actions.

The note to section 17 clarifies that while a proponent may carry out more than two management actions in a carbon estimation area, only two actions will be credited.

18 Application requirements—nutrient management

If the project proponent nominates nutrient management as a management action that will be undertaken as part of sustainable intensification in a carbon estimation area, the proponent must provide the matters referred to in section 18 to the Regulator before undertaking the action.

Section 18 requires that proponents provide advice from a qualified person. A qualified person (as defined in the *Guidelines—Qualified Person under the Estimating Sequestration of Carbon in Soil Using Default Values Determination*) has formal qualifications in the relevant areas of agricultural production such as soil health and plant nutrition (for nutrient management) soil acidity management (for management of soil acidity) and pasture management (for pasture renovation). A qualified person may use a variety of information about a carbon estimation area, such as previous nutrient applications, yield records and soil or plant tissue testing, to formulate advice. In addition to formal training and expertise, a qualified person is likely to be industry accredited.

Subsection 18(2) specifies that the qualified person must not have provided the advice any earlier than three months before the proponent applies to the Regulator for declaration of the project (or to vary the project area). This is to ensure that the advice is relatively current when the application is made.

Subsection 18(4) provides that the advice from a qualified person must state that the carbon estimation area has a material deficiency of at least one of the four nutrients relevant to the determination, and was likely to have had such a deficiency in every year during the baseline emissions period.

A material deficiency is when plant growth is limited to 70% or less of the water limited yield potential, as a result of the lack of one or more nutrients. For further information on how to use soil testing to determine whether nutrients are limiting yield, refer to the Grains Research & Development Corporation *Crop Nutrition Fact Sheet – soil testing for crop nutrition series* available at: <http://www.grdc.com.au/>.

Subsection 18(5) sets out examples of evidence on which the advice must be based. The advice must be based on at least one of the listed types of evidence.

19 Application requirements—soil acidity management

If the project proponent nominates soil acidity management as a management action that will be undertaken as part of sustainable intensification in a carbon estimation area, the proponent must provide the matters referred to in section 19 to the Regulator before undertaking the action.

Section 19 requires that proponents provide advice from a qualified person about the average soil pH levels in the carbon estimation area.

The determination defines carbon estimations areas with soils that have an average pH of less than 5.5 in surface soils (the 0–10 centimetre layer) and an average pH of less than 4.8 in subsoils (below 10 centimetres) to be acidic and therefore eligible to have soil acidity management carried out as a management action.

Subsection 19(5) sets out evidence on which the advice must, as a minimum, be based. It also requires that the advice specify the results of the testing of the soil pH.

20 Application requirements—new irrigation

If the project proponent nominates new irrigation as a management action that will be undertaken as part of sustainable intensification in a carbon estimation area, the proponent must provide the evidence referred to in section 20 before undertaking the action.

Note 1 to section 20 contains examples of evidence that could be provided to demonstrate that the carbon estimation area was not under irrigation during the five years of the baseline emissions period.

21 Application requirements—pasture renovation

If the project proponent nominates pasture renovation as a management action that will be undertaken as part of sustainable intensification in a carbon estimation area, the proponent must provide the evidence referred to in section 21 before undertaking the action.

Pasture renovation may only be undertaken as a management action in a carbon estimation area that has been under pasture for at least the two years immediately before the evidence is provided to the Regulator.

Note 1 to section 21 contains examples of evidence that could be provided to demonstrate that the carbon estimation area was under pasture during that period.

Subdivision 4—Stubble retention

Where stubble (crop residues) is removed from a carbon estimation area, carbon inputs to the soil are reduced. Ceasing removal of stubble as part of a stubble retention project provides a new stream of biomass inputs to the soil which can help to maintain soil carbon levels.

Subdivision 4 sets out matters that must be provided to the Regulator before undertaking stubble retention as a project management activity.

22 Application requirements—stubble retention

If the project proponent nominates stubble retention as a project management activity for a carbon estimation area, the proponent must provide the evidence referred to in section 22 with the application for declaration.

Stubble retention can only occur in a carbon estimation area where crops have been growing. Accordingly paragraph 22(1)(a) requires that the proponent provide evidence that demonstrates that the project management activity will occur on a carbon estimation area that was under crops at least once a year during the baseline emissions period.

The effect of paragraph 22(1)(b) is that the proponent must demonstrate that for at least four out of the five years in the baseline emissions period, at least 30% of stubble was removed from the area by burning or baling.

The note to subsection 22(1) contains examples of evidence that the proponent could provide to demonstrate that stubble removal actually occurred in the relevant carbon estimation area for at least four years of the baseline emissions period.

In some carbon estimation areas there may have been periods during the baseline emissions period where stubble could not be removed. This would most likely occur if, for example, seasonal conditions meant it was too wet to burn or bale. It could also occur if crops were not planted at all during that year. In such years it may not have been viable, or even possible, for the proponent to remove the amount of stubble required to demonstrate that stubble removal was the BAU management practice for the carbon estimation area.

Under paragraph 22(1)(b), a proponent is allowed to have burnt or baled less than 30% of stubble in one year of the baseline period.

Subsection 22(2) clarifies, however, that this ‘exception’ year cannot be the year immediately before the application is lodged with the Regulator. If a proponent has already ceased burning or baling crop stubble in the lead up to the project, it is likely that stubble retention undertaken as part of the project would not be additional.

Subdivision 5—Conversion to pasture

Soil carbon levels are typically higher under pasture than under land that is continuously cropped or bare fallowed. The larger amount of fine roots associated with pasture and the greater ground cover assists to build and retain soil carbon.

Subdivision 5 sets out matters that must be provided to the Regulator before undertaking conversion to pasture as a project management activity.

23 Application requirements—conversion to pasture

If the project proponent nominates conversion to pasture as a project management activity for a carbon estimation area, the proponent must provide the evidence referred to in section 23 to the Regulator before undertaking the activity.

Section 23 requires the proponent to provide evidence to demonstrate that the relevant carbon estimation area was never under pasture during the baseline emissions period, and that crops were grown in the area in each year of the baseline emissions period. This ensures that continuous cropping or bare fallow, or both, was BAU management practice for the relevant carbon estimation area in accordance with assumptions underpinning the modelled sequestration estimate.

Note 1 to section 23 contains examples of evidence that the proponent could provide to meet the requirements in paragraphs 23(a) and (b).

Division 3—Requirements for eligible projects

Division 3 sets out the general requirements for eligible soil carbon projects.

Many of the management actions in the determination, such as installing irrigation infrastructure, applying nutrients or lime, and establishing new pastures, may require substantial investment to implement. This creates a strong financial incentive for proponents to undertake the activities in a manner that maximises primary productivity, and hence yield, as this will increase the viability of the project. This financial incentive to increase productivity aligns with the objectives of the determination to increase carbon flows into the soil, making it likely that the activities will be carried out in a manner that genuinely maximises biomass production.

For example, due to the cost of purchasing and applying fertiliser, a proponent is not likely to choose to undertake nutrient management if plant production is not genuinely limited by nutrient deficiency. Similarly, the cost of purchasing and applying irrigation water means that proponents will likely make all endeavours to increase productivity in a carbon estimation area where irrigation is introduced as a management action.

Given this overarching alignment of incentives the determination does not establish unnecessarily detailed requirements and standards regarding activity implementation. Rather, the determination focuses on managing the risk of adverse environmental outcomes (such as through the inappropriate application of nutrients) and establishing a framework that ensures the activity will contribute to both productivity and soil carbon outcomes.

Subdivision 1—General requirements for eligible projects

24 General requirements for soil carbon projects

Section 24 sets out the general requirements for eligible soil carbon projects.

Subsection 24(1) specifies that, during the nominated permanence period, a project management activity must be carried out in a carbon estimation area. Paragraph 24(1)(b) clarifies that the activity must be carried out in compliance with the eligibility requirements in Division 3 of Part 3.

Paragraph 24(2)(a) provides that the activity carried out in the carbon estimation area may be the original activity specified in the application for declaration as an eligible offsets project, or a subsequent activity to which the proponent has changed under section 85. Section 85 allows project management activities and management actions to be changed subject to certain limitations.

Subsection 24(3) clarifies that ‘non-project’ land management activities may be carried out in a carbon estimation area in which management actions are being carried out under the project.

Subdivision 2—Sustainable intensification—general requirements

25 Sustainable intensification—management actions

Subsection 25(1) provides that sustainable intensification must consist of two of the management actions listed in paragraphs (a)–(d).

Subsection 25(2) clarifies that the actions must be those that the project proponent nominated when applying for declaration as an eligible offsets project under section 22 of the Act, or applying to vary the project area (as provided for under section 29 of the Act), unless the proponent has changed the actions under section 85.

Subsection 25(3) specifies that the two management actions specified in the application are the ‘nominated management actions’. The nominated management actions are the creditable management actions—that is, although more than two actions may be undertaken in a carbon estimation area, only two are required for the project management activity to obtain credits.

Subsection 25(4) clarifies the date when sustainable intensification as a project management activity is taken to have started. This date depends on whether the two nominated management actions start at the same time or separately. If separately, the project management activity is taken to have started at the time when the earlier of the two management actions began, provided the second action begins no later than six months after the first action.

Subsection 25(5) clarifies that two management actions will not constitute a sustainable intensification project management activity in a carbon estimation area if the actions were started more than six months apart.

26 Sustainable intensification—stubble removal event in carbon estimation area under crops

Section 26 sets out the general rule limiting the frequency of stubble removal events in carbon estimation areas under crops in sustainable intensification.

A stubble removal event refers to burning or baling that occurs in a carbon estimation area under crops and that removes stubble from the area. No more than one such event may occur in the area in every five years that the area is under crops. In counting the five years for the purposes of the section, only those years in which crops are grown on the land may be counted. For example, crops may be grown on the land every second year. That would mean that the five years that the land is under crops would occur in a 10-year period. Section 26 provides that if a stubble removal event occurred in more than one of the five years in which the land is under crops, then the soil carbon project would not be eligible.

The effect of section 26 is that if sustainable intensification is carried out on land under crops, the crop residues must be retained on the carbon estimation area. This is because any soil carbon benefits from additional biomass production will be lost if the biomass is removed from the carbon estimation area.

Subdivision 3—Eligibility requirements for nutrient management

Subdivision 3 outlines the requirements for nutrient management and the written strategy underpinning the management action.

27 Nutrient management—management action

Section 27 sets out the requirements that must be met for nutrient management to be a management action as part of a sustainable intensification project management activity.

Subsection 27(2) specifies that a nutrient management strategy must be obtained before the action commences. This is because the strategy informs the action.

Subsection 27(3) specifies that applying nutrients to a carbon estimation area in accordance with the most recent nutrient management strategy and with the determination is when the management action of nutrient management is taken to have begun. Subsection (3) specifies ‘the most recent nutrient management strategy’ because it is possible that a project could involve nutrient management for some years, then another management action for a few years, then switch back to nutrient management. Subsection (3) ensures that first application of nutrients under the most recent strategy is used to determine when the current nutrient management action began.

Subsection 27(4) requires the nutrients to be applied to the carbon estimation area using the instructions detailed in the relevant nutrient management strategy. For example, the strategy may require that a paddock be top-dressed with 50 kilograms of nitrogen per hectare in the week ahead of sowing. The rate, form, timing and placement specified by the strategy will vary according to the needs of the soil and crop. It may also vary from carbon estimation area to carbon estimation area.

Subsection 27(5) requires that the nutrient management does not have an adverse impact on the environment. For example, nutrients should be applied to a carbon estimation area so as to manage the risk of leaching and run-off to water sources.

Subsection 27(6) requires reapplication of nutrients at certain rates. This ensures regular maintenance of nutrient levels so that the soil does not have an imbalance or lack of nutrients between applications.

The effect of subsection 27(6) is that if the nutrient management strategy is silent regarding the rate of reapplication, then the nutrients must be reapplied at least every 5 years during the project. If the strategy does specify a rate of reapplication, and if the rate is more frequent than every 5 years, then the strategy’s rate must be followed. In this way subsection 27(6) sets a maximum period of 5 years between reapplications.

Subsection 27(7) requires appropriate testing, as defined in section 6, to be undertaken at regular intervals to inform soil and nutrient management and revisions of the nutrient management strategy. Five years is considered a reasonable time frame for both crop and pasture areas. However, testing may be undertaken more frequently if needed to suit land management or as required by the qualified person for the purposes of correcting the material deficiency and revising the strategy.

28 Nutrient management—strategy

Section 28 specifies the requirements for a nutrient management strategy.

Subsection 28(1) provides that the strategy must be in writing, and must be prepared by a qualified person. It must also be signed and dated by that qualified person. The requirements for a qualified person are outlined in the *Guidelines—Qualified Person under the Estimating Sequestration of Carbon in Soil Using Default Values Determination*. This document is published on the Department’s website.

Subsection 28(2) specifies details about the nutrient management practices that must be contained in the strategy.

The method for achieving the aims of the strategy will take into account the specific circumstance of the carbon estimation area (or areas) to which the strategy applies. This approach provides flexibility for proponents, given the many different types of soil and plant tissue testing available and their suitability for different situations, while ensuring that robust evidence underpins nutrient management decisions. The qualified person may prescribe any combination of nutrient management practices suitable to the carbon estimation area and land management practices if the aims of the activity and strategy are met.

Paragraph 28(2)(a) requires that the strategy outline practices that could reasonably be expected to correct the material deficiency of nutrients in a carbon estimation area each year that the strategy is in effect.

Paragraph 28(2)(b) requires that the strategy also outline practices that could reasonably be expected to result in improved biomass. Improved biomass is when there is an increase in, for example, the yield of crops or pasture growth which may also be indicated by an increase in ground cover. It may also be an increase in root growth. The increase in biomass results in higher soil carbon.

Paragraph 28(3)(a) requires that nutrients be applied to a carbon estimation area to meet the material deficiency and at least to replace the nutrients that will be removed through crops or pasture produced on the carbon estimation area before the next nutrient application. This ensures that biomass production will not be improved by ‘mining’ the soil nutrient levels in the carbon estimation area.

Paragraph 28(3)(b) outlines a plant growth target for the strategy that is indicative of good nutrient and soil management. The strategy is required to outline practices designed to achieve this each year. A strategy should be in place for each year of the project but does not need to forecast for all years of the project in the one strategy. It must be reviewed at least every five years.

Subsection 28(4) outlines the basic requirements of the strategy. The strategy could include more detail if the qualified person considers that the additional detail is appropriate to correct the material deficiency. This information could include managing nutrient management given different levels of rainfall or indicators of the crop or pasture during the crop.

Subsection 28(5) requires that the nutrient management strategy must take into account other possible limitations to sustainable intensification in the carbon estimation area. A limitation could be anything that may have an impact on the effectiveness of the project management activity undertaken in the carbon estimation area. Examples of limitations other than a material deficiency in nutrients are set out in the note to subsection 28(5). These limitations could include soil sodicity, which relates to the amount of sodium held in a soil. Soil acidity may be another limitation in the area that the strategy may need to take into account if soil acidity management is not being undertaken in the carbon estimation area as a management action. Micronutrients may also limit the effectiveness of actions to improve soil carbon in a carbon estimation area and may therefore need to be taken into account. Micronutrients include zinc, iron, molybdenum, manganese and others.

Paragraph 28(6)(a) requires that the strategy specify the evidence used to determine how the practices or steps prescribed in the strategy will result in improved biomass in the carbon estimation area.

Paragraph 28(6)(b) requires that the strategy specify the evidence that demonstrates how a product prescribed in the strategy will help achieve the strategy’s aims.

Evidence relating to these matters must be included in the strategy to ensure that the qualified person develops a well-informed strategy that is likely to achieve the stated aims and therefore likely to result in productivity and soil carbon benefits. It also serves as a resource to the landowner and provides an objective requirement that can be verified as part of the broader auditing requirements and should be a consideration as to whether the action, based on the strategy, has been carried out.

29 Nutrient management—appropriate testing for strategy

Section 29 sets out requirements for the appropriate testing on which a nutrient management strategy may be based.

Subsection 29(1) requires that the first strategy be based on recent testing, to ensure that information about the state of the soil is relatively current.

There are limited circumstances in which testing does not need to be undertaken for a nutrient management strategy.

The first exception to the requirement to test for nutrients is set out in subsection 29(2). This provision specifies that if a carbon estimation area is known not to be deficient in a certain nutrient, and a qualified person can provide reasons as to why this is known, then testing for the nutrient does not need to occur. It should be noted that the nutrient referred to in paragraph 29(2)(a) is different from the nutrient to be applied to the carbon estimation area and in which the carbon estimation area is deficient.

The second exception is set out in subsection 29(3). According to this provision, if it can be demonstrated by other means that a carbon estimation area is deficient in nitrogen, then appropriate testing for that nutrient does not need to be undertaken. This is because levels of nitrogen in soil may be estimated relatively easily through other means such as visual inspections, monitoring yields or nutrient budgeting.

Subsection 29(4) specifies that subsequent strategies must be based on testing that is no more than 12 months old from the time the strategy is prepared. Again, this ensures that each strategy is based on relatively recent information.

30 Nutrient management—review of strategy

Section 30 requires that every five years the nutrient management strategy must be reviewed and, if necessary, revised. This ensures that nutrients are applied in a manner that is suitable for each carbon estimation area, and that management can adapt over time as needed.

The note to section 30 reminds project proponents that in Part 5 of the determination there is a reporting requirement that relates to strategy revisions.

Subdivision 4—Eligibility requirements for soil acidity management

Subdivision 4 outlines the requirements for soil acidity management and the written strategy underpinning the management action.

31 Soil acidity management—management action

Section 31 sets out the requirements for the management action of applying lime to soil.

A written strategy for soil acidity management must be developed before the activity commences. Lime must be applied in accordance with the strategy at rates that are estimated to bring the average soil acidity of the carbon estimation area to more than pH 5.5 in the top soils within five years.

Subsequent soil testing of the carbon estimation area is required every five years. Lime must be reapplied at the rate specified in the most recent strategy. Paragraph 31(5)(b) clarifies that the period between reapplications must not be more than 5 years. Subsection 31(6) specifies that lime does not have to be reapplied if the testing shows that the average pH of the soils within the carbon estimation area remains above pH 5.5.

32 Soil acidity management—strategy

Section 32 specifies the requirements for a soil acidity management strategy.

Subsection 32(1) provides that the strategy must be in writing, and must be prepared and, if required, revised, by a qualified person. That qualified person must sign and date the strategy.

Subsection 32(2) provides that the strategy must outline practices that could be reasonably expected to bring soils to a range of pH that is considered by industries and experts to be ideal for the majority of agricultural practices and improve soil carbon levels. As surface soils are easier to ameliorate, the target pH must be designed to be achieved no later than five years from the first application of lime.

Correcting a soil acidity imbalance in sub-soils (10 centimetres depth and lower) is challenging and can take several years. The determination notes that the acidity management strategy must aim to correct the pH of sub-soils but does not apply a strict time-frame to this endeavour.

The strategy should detail key information such as the type of carbonate (for example magnesium or calcium carbonate and the neutralising value), the amount to be applied, when (particularly in relation to crop and pasture growth), and where it is applied (surface and/or sub-surface applications). The strategy must ensure practices do not adversely impact the environment.

Subsection 32(4) requires that testing for the first strategy be undertaken no earlier than one year before the proponent applies to the Regulator for declaration as an eligible offsets project under section 22 of the Act, or to vary the project area (as provided for under section 29 of the Act). Subsequent strategies must be based on testing that is no older than 12 months. This ensures that each strategy is based on recent information.

Subsection 32(5) requires that the soil acidity strategy must take into account other possible limitations to sustainable intensification in the carbon estimation area. The limitation could be anything that may have an impact on the effectiveness of the project management activity undertaken in the carbon estimation area. Examples of limitations other than soil acidity are set out in the note to subsection 32(5). These limitations could include soil sodicity, which relates to the amount of sodium held in a soil. A material deficiency in one or more nutrients could be another limitation in the area that the strategy may need to take into account if nutrient management is not being undertaken in the carbon estimation area as a management action. Micronutrients may also limit the effectiveness of actions to improve soil carbon in a carbon estimation area and may therefore need to be taken into account. Micronutrients include zinc, iron, molybdenum, manganese and others.

Paragraph 32(6)(a) requires that the strategy specify the evidence used to determine how the practices or steps prescribed in the strategy will result in improved biomass in the carbon estimation area.

Paragraph 32(6)(b) requires that the strategy specify the evidence that demonstrates how a product prescribed in the strategy will help bring soils to the pH levels and timeframes specified in subsection 32(2).

Evidence relating to these matters must be included in the strategy to ensure that the qualified person develops a well-informed strategy that is likely to achieve the stated aims and therefore likely to result in productivity and soil carbon benefits. It also serves as a resource to the landowner and provides an objective requirement that can be verified as part of the broader auditing requirements and should be a consideration as to whether the activity, based on the strategy, has been carried out.

33 Soil acidity management—review of strategy

Section 33 requires that the soil acidity strategy be reviewed every five years and, if necessary, revised. The strategy may be reviewed more frequently if required. This ensures that lime is applied in a manner that is suitable for each carbon estimation area, and that management can adapt over time as needed.

The note to section 33 reminds project proponents that in Part 5 of the determination there is a reporting requirement that relates to strategy revisions.

Subdivision 5—Eligibility requirements for new irrigation

Subdivision 5 outlines the requirements for new irrigation as a management action in a sustainable intensification project management activity.

34 New irrigation—management action

Introducing irrigation into previously non-irrigated areas has the potential to sequester soil carbon by increasing biomass production. The determination requires that the water used to irrigate the new areas is additional water. That is, water sourced from either the acquisition of new water from a water access entitlement or irrigation right that has been obtained after the application for declaration of the project as an eligible offsets project, or from on-farm efficiency improvements. This is because these sources of water are relatively easily accounted for and are less likely to lead to unintended environmental or economic impacts.

The on-farm efficiency improvements must occur outside of the carbon estimation area in which new irrigation is undertaken as a management action.

It is acceptable to acquire additional water through a temporary trade in water allocated to a water access entitlement held by a third party.

The determination specifies that a minimum amount of 2 megalitres of additional water must be applied to relevant carbon estimation areas each year. This volume of water is considered to be the minimum threshold amount needed to produce a significant increase in biomass for a low-water requirement crop. It is noted that this is only a minimum amount to meet the requirements for new irrigation as a management action and some crops will require more water.

In some instances, if a proponent sources additional water by securing newly acquired water from an in-stream water or groundwater water access entitlement or irrigation right, a potential carbon leakage risk arises. In some cases, such as fully allocated catchments, the entitlement may have been acquired from another irrigator resulting in displaced biomass growth. Although the project area in which the management action is undertaken will experience an increase in soil carbon, a different area of land outside of that project area may no longer be used to grow irrigated crops or pasture—potentially leading to a reduction in soil carbon that could offset project sequestration.

Given the difficulty of quantifying the magnitude of the leakage risk, and the fact that the likelihood of leakage occurring can vary considerably depending on the catchment in which the project is operating, the determination applies a flat 50% discount to sequestration arising

from the use of additional water where any water is sourced from new in-stream entitlements or allocations. This discount is included in the sequestration equations in Part 4. This factor is represented as 0.75 as there are two management actions required in the activity and the 50% discount only applies to one action.

It is a requirement of the Act that ERF projects are additional and do not receive funding for the same results from other programs. Sequestration from projects must not be likely to have occurred in the absence of the project due to funding from another Commonwealth, State, Territory or local government program or scheme. The determination provides that eligible irrigation projects must not source their water from efficiency upgrades paid for in full or in part by Commonwealth, State, Territory or local government programs.

35 New irrigation—additional water

Section 35 sets out requirements for the application of additional water to the carbon estimation area in which new irrigation is undertaken.

Subsection 35(2) provides that additional water must not be applied to a carbon estimation area if the environmental conditions at the time would prevent the water achieving an increase in yield or pasture growth.

Conversely, the inability to apply additional water to a carbon estimation area due to natural events such as a drought may result in a depletion event under the determination. Depletion events are dealt with in Part 4.

Subdivision 6—Eligibility requirements for pasture renovation

Subdivision 6 outlines the requirements for pasture renovation and the written strategy underpinning the management action.

36 Pasture renovation—management action

Pastures are renovated in order to improve productivity, often by re-sowing with more vigorous species. A renovated pasture is expected to produce higher biomass yield than the previous pasture, resulting in increased soil carbon sequestration. A strategy for pasture renovation must be developed before the activity commences.

In order to sequester soil carbon, the pasture must successfully re-establish following renovation. The determination specifies that the pasture must achieve a certain level of groundcover within 12 months in order to have been considered successful. Renovated pastures that do not achieve the coverage target within the specified time will be considered to have failed. A failed pasture renovation will not be considered to have achieved soil carbon sequestration.

The note to subsection 36(4) reminds proponents that there are monitoring and record keeping requirements relating to vegetation groundcover in Part 5 of the determination.

Pasture renovation is an expensive exercise. Provided that the proponent can demonstrate that the renovation occurred (for example through receipts for machinery or seed), and that the pasture successfully re-established, it is reasonable to assume that the proponent will take all reasonable steps to ensure that the pasture is actively growing and, hence, sequestering carbon.

Subsection 36(5) allows for any combination of grass species as each category of species can result in soil carbon. Paragraph 37(3)(a) requires the strategy to provide advice on the appropriate species to use.

Subsection 36(6) is designed to ensure that the pasture renovation occurs as a positive management activity, rather than simply allowing a tilled area to regrow grasses from old seed in the soil. This is because the latter approach is unlikely to result in a high quality pasture that builds soil carbon. The provision does not mean the same vegetation species cannot be grown in both the old and the new pasture, but that seed is sown to establish the new pasture.

37 Pasture renovation—strategy

Section 37 specifies the requirements for a pasture renovation strategy.

To encourage a successful pasture, a strategy must be developed by a person with experience and knowledge in the area (in accordance with *Guidelines—Qualified Person*) and detailed in a written document. That qualified person must sign and date the strategy.

The strategy must provide guidance on key issues in pasture renovation including those listed in subsection 37(3). For example, the strategy must include advice on appropriate species to use, as specified in paragraph 37(3)(a). Certain species will not be appropriate for all industries and land types. The qualified person will therefore be able to design a strategy that encourages the appropriate balance for soil carbon sequestration.

Subsection 37(4) requires that the pasture renovation strategy must take into account other possible limitations to sustainable intensification in the carbon estimation area. A limitation could be anything that may have an impact on the effectiveness of the project management activity undertaken in the carbon estimation area. Examples of limitations other than poor pasture are set out in the note to subsection 37(4). These limitations could include soil sodicity, which relates to the amount of sodium held in a soil, or a material deficiency in one or more nutrients, or soil acidity. Micronutrients may also limit the effectiveness of actions to improve soil carbon in a carbon estimation area and may therefore need to be taken into account. Micronutrients include zinc, iron, molybdenum, manganese and others.

Paragraph 37(5)(a) requires that the strategy specify the evidence used to determine how the steps prescribed in the strategy will result in improved biomass in the carbon estimation area.

Paragraph 37(5)(b) requires that the strategy specify the evidence that demonstrates how a product prescribed in the strategy will help re-establish pasture in a carbon estimation area.

Evidence relating to these matters must be included in the strategy to ensure that the qualified person develops a well-informed strategy that is likely to achieve the stated aims and therefore likely to result in productivity and soil carbon benefits. The strategy should serve as a resource to the landowner. It should also be able to be verified as part of the broader auditing requirements applying to the project, and should be used as part of the process to determine whether the activity has been carried out.

38 Pasture renovation—review of strategy

Section 38 requires that the pasture renovation strategy be reviewed every five years and, if necessary, revised. The strategy may be reviewed more frequently if required. This ensures that pasture is re-established in a manner that is suitable for each carbon estimation area, and that maintenance practices can adapt over time as needed.

The note to section 38 reminds project proponents that in Part 5 of the determination there is a reporting requirement that relates to strategy revisions.

Subdivision 7—Eligibility requirements for stubble retention

Subdivision 7 outlines the requirements for stubble retention as a project management activity in a carbon estimation area.

Stubble retention ensures biomass stays in the carbon estimation area instead of being removed due to burning or baling. The biomass reduces emissions from soil and can sequester carbon.

39 Eligibility requirements for stubble retention

Stubble must be kept in the carbon estimation area after each harvest or crop growth. Stubble includes the roots, leaves and other biomass that does not form the majority of the yield (for example, grain, but which will vary from crop to crop). If any of this biomass is burnt or baled then the activity is not considered to be carried out.

It is recognised that there may be occasions where there is a legitimate management need to remove stubble. For example, an above-average crop in one year may result in a large amount of stubble that impedes tillage for the next crop. Similarly, stubble may need to be removed through burning or baling to manage a build-up of weeds or an outbreak of disease.

Accordingly, the determination allows for burning or baling to occur no more frequently than once every five years that the carbon estimation area is under crops. This provides proponents with some flexibility to manage unusual conditions, and credits will still be awarded in the year that stubble was removed. This is because the modelling underpinning the sequestration estimates for this activity took into account one year of stubble removal for every four years of stubble retention. If burning or baling occurs more frequently than one ‘crops year’ in five, the action of stubble retention is considered to have ceased.

Subsection 39(3) clarifies when retaining stubble is considered to have begun as a management action in a carbon estimation area. The effect of subsection 39(3) is that the first sowing after the most recent harvest is taken to be when the action begins. This allows the commencement time for the action to be determined regardless of whether the action is carried out at the start of a project or later in the life of the project.

Subdivision 8—Eligibility requirements for conversion to pasture

Subdivision 8 outlines the requirements for conversion to pasture and the written strategy underpinning the project management activity.

Soil carbon levels are typically higher under pasture than under land that is continuously cropped. The larger amount of fine roots associated with pasture and the greater ground cover assists to build and retain soil carbon.

40 Conversion to pasture—management action

Subsection 40(1) provides that converting land to pasture includes seeding and maintenance in accordance with a conversion to pasture strategy developed by a qualified person. The action must be carried out on land that was under crops, bare fallowed, or both at the same time, immediately before conversion to pasture is taken to have commenced.

Subsection 40(3) specifies that conversion to pasture is taken to have begun when the first seeds are added to the area under a conversion to pasture strategy.

Section 40 specifies additional requirements for conversion to pasture that are similar to requirements for the pasture renovation management action.

41 Conversion to pasture—strategy

Section 41 specifies the requirements for a conversion to pasture strategy. These requirements are similar to the requirements for a pasture renovation strategy.

42 Conversion to pasture—review of strategy

Section 42 requires that the conversion to pasture strategy be reviewed every five years and, if necessary, revised. The strategy may be reviewed more frequently if required. This ensures that pasture is established in a manner that is suitable for each carbon estimation area, and that maintenance practices can adapt over time as needed.

The note to section 42 reminds project proponents that in Part 5 of the determination there is a reporting requirement that relates to strategy revisions.

Subdivision 9—Other eligibility requirements

43 Clearing woody vegetation

Section 43 prohibits proponents from clearing woody vegetation from within a project area other than in accordance with certain conditions.

This is because clearing woody vegetation releases carbon that had previously been sequestered in the vegetation biomass. If the clearing of vegetation occurred as a result of the project then this release of carbon would offset sequestered soil carbon.

If a proponent carries out clearing of woody vegetation in accordance with pre-existing clearing rights and all applicable laws and regulations, then it is assumed that the clearing would have occurred in the absence of the project and so these emissions are not accounted for as project related emissions.

44 Newness requirement

A key requirement of the ERF is that credits are issued for emissions reductions that are ‘additional’—that is, emissions reductions would not likely have occurred under normal business conditions, in the absence of the ERF.

Section 44 specifies a requirement in lieu of the newness requirement under subparagraph 27(4A)(a)(ii) of the Act for soil carbon projects. The specified requirement is to ensure that the assessment of newness disregards any written strategy that may be used to implement a project management activity or management action but that is prepared before the activity or action begins. Section 44 clarifies that the project must otherwise comply with the ‘newness requirement’ set out in subparagraph 27(4A)(a)(i) of the Act.

Projects under the determination must meet the other additionality requirements of the Act. These are the regulatory additionality requirement and the government program requirement.

Part 4—The net abatement amount

Division 1—The net abatement amount—general

45 The net abatement amount

Section 45 refers to paragraph 106(1)(c) of the Act, which provides that the Minister may, by legislative instrument, make a determination that:

provides that, if such a project is an eligible offsets project, the carbon dioxide equivalent net amount for the project in relation to a reporting period for the project is taken, for the purposes of this Act, to be equal to the amount ascertained using a method specified in, or ascertained in accordance with, the determination.

Subsection 45(1) clarifies that Part 4 of the determination specifies the carbon dioxide equivalent net amount for the project for the purposes of paragraph 106(1)(c) of the Act.

Subsection 45(2) provides that the carbon dioxide equivalent net abatement amount in relation to a reporting period for the project is taken to be the increase in soil carbon sequestration associated with the relevant management actions for a project area, less the change in project emissions during the reporting period.

46 Overview of gases accounted for in abatement calculations

Section 46 describes the greenhouse gas sources and relevant carbon pools that are assessed in order to determine the net abatement amount. This is known as the ‘greenhouse gas assessment boundary’. The greenhouse gas assessment boundary includes the soil carbon pool within a project area and all other on-farm emissions sources and sinks that are directly or indirectly affected by the project. These sources and sinks are:

- (a) soil organic carbon;
- (b) livestock;
- (c) synthetic fertiliser;
- (d) lime;
- (e) non-synthetic fertiliser;
- (f) fuel use;
- (g) residues;
- (h) above-ground woody biomass;
- (i) fire.

The effect of section 46 is that when making calculations under Part 4:

- (a) the carbon pools and emission sources and the corresponding greenhouse gases in Table 1 must be taken into account; and
- (b) no other gases, carbon pools or emission sources may be taken into account.

Not all sources and sinks within the greenhouse gas assessment boundary must be accounted for in determining net abatement for a range of reasons. In some cases management will not affect the factors that drive emissions from a particular source. In other cases, although there is a change in management that relates to a particular source, the emissions that are released from that source in the project are, for all intents and purposes, likely to be equivalent to those that would have been released in the absence of the project. In some instances the emissions from a particular source may change, but there is no causal link between the project itself and

the emissions, or the emissions are out of the control of the proponent. The rationale behind including or excluding each of the sources and sinks listed above from the net abatement calculations is set out below.

Soil organic carbon

This is the primary emissions sink within the project and the basis for crediting under the determination. Changes in this pool are included in calculations of abatement.

Livestock

Livestock emissions can change with increases or decreases in stocking rate or with changes to the quality of feed available. Livestock numbers are considered to be the primary driver of livestock emissions (enteric fermentation, dung and urine). Proponents must estimate changes in emissions resulting from increases or decreases in stocking rate compared to historic levels using methods derived from National Inventory Report processes.

Providing for proponents to calculate potential changes in livestock emissions due to different feed quality would overly complicate the determination and so the effect of dietary changes are not accounted for within the abatement calculations. This is considered conservative as most of the management actions under the determination could reasonably be expected to increase the quality of livestock feed and, hence, to slightly reduce livestock emissions.

Synthetic fertiliser

Several management actions (for example, nutrient management and pasture renovation) may result in increased applications of synthetic fertiliser compared to a BAU scenario. Industry data shows that the majority of key fertilisers likely to be used in soil carbon projects are imported from overseas countries rather than being manufactured in Australia. As international carbon accounting rules require emissions to be accounted for at their point of generation, the determination does not account for emissions associated with the manufacture of synthetic fertiliser.

In accordance with the National Inventory Report, emissions of nitrous oxide from the application of synthetic nitrogenous fertiliser (and also of carbon dioxide from the application of urea) must be accounted for. Proponents must estimate changes in emissions resulting from increases in synthetic fertiliser application compared to historic levels using methods derived from National Inventory Report processes.

Lime

Several project management activities (for example, soil acidity management and pasture renovation) may result in increased applications of lime compared to a BAU scenario. The National Inventory Report accounts for the carbon dioxide emissions that result from applications of either magnesium carbonate or calcium carbonate to agricultural soils. These emissions must be accounted for in the determination using the conservative default emission factor derived from National Inventory Report processes.

Non-synthetic fertilisers

Non-synthetic fertilisers, such as compost or manure, comprise materials from the waste streams of different processes (e.g. domestic green waste, cotton gin trash, grape marc, feedlot manure, chicken litter, food waste etc). Emissions from the production of these materials are not accounted for in deriving net abatement because these fertilisers are the by-product of other processes (such as intensive animal production) and their emissions would have occurred irrespective of the project.

The emissions associated with the application of non-synthetic fertiliser to land, any processing of feedstocks to form the value-added organic fertiliser (such as compost), and the subsequent decomposition of the fertiliser would be less than, or equal to, the emissions from the feedstock in the absence of the project. There is limited relevant Australian data on this issue. A US study found, however, that emissions associated with creating a compost from even high-nitrogen materials were ‘minimal’ compared to those avoided by the decomposition of the same material.¹ The 2006 IPCC guidelines provide emission factors for both compost production and for spreading manure that are lower than for manure which is either stockpiled or disposed of to landfill.² Therefore emissions from processing of organic waste feedstocks into compost and for applying non-synthetic fertiliser to soil do not need to be accounted for.

Irrigation energy

Irrigating previously non-irrigated areas may involve a material increase in emissions due to diesel fuel or electricity use, being the two main sources of energy for irrigation.

Other changes in energy use resulting from the project are likely to be immaterial. Fuel use associated with additional tillage is accounted for under residues and other project management actions, involving application of lime or fertiliser for example, are unlikely to increase fuel use to the point where it becomes a material source of emissions. Therefore fuel use and electricity use emissions, other than for irrigation, are considered to be immaterial and are not accounted for in calculating net abatement.

Residues

Residues from crops or pasture result in the release of nitrous oxide emissions when they are tilled into the soil. Some project management activities and management actions are expected to increase emissions from residues, such as: use of irrigation water on crops, renovation of pastures and tillage of crops. The determination uses default factors and processes derived from the National Inventory Report to calculate changes in emissions from residues.

Above ground woody biomass

Management actions undertaken as part of the project are unlikely to cause an increase in above-ground woody biomass. Project proponents are unlikely to allow woody biomass levels to increase significantly as this would potentially decrease the productivity of cropland or pasture. The sequestration values modelled for the determination do not consider increases in above ground woody biomass and projects under the determination cannot be carried out in forested areas. Accordingly emissions from this source/sink are not accounted for in estimating net abatement.

Emissions may increase if the proponent clears an area of woody vegetation as a result of the project. The determination does not allow for woody vegetation to be cleared from a project area unless the clearing meets certain requirements that indicate that the clearing would likely have occurred at some point under a BAU scenario.

Fire

Management actions undertaken as part of the project are unlikely to lead to an increase in the frequency or intensity of (and hence emissions from) fire events. This is because woody biomass levels are unlikely to increase significantly and clearing of new areas of vegetation is subject to regulations. Some activities, such as stubble retention, will reduce emissions from this source where stubble is no longer burned. While there may be increased ground cover

¹ Brown et al, Greenhouse gas balance for composting operations, Journal of Environmental Quality, 2008 Jun 23; 37(4):1396-410, p.1.

² IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, IPCC p.10.63.

and pasture production due to sustainable intensification, there is also likely to be increased or similar levels of pasture growth utilisation through grazing. As such grass fire frequency and intensity is not expected to change significantly. Accordingly this source is not included within the abatement calculations.

The carbon pools and emission sources that need to be taken into account when calculating abatement for the project are set out in Table 1 in the determination. The table below provides further detail on each emission source and provides justification for inclusion or exclusion from the greenhouse gas assessment boundary.

Baseline emissions			
<i>Carbon pool or emission source</i>	<i>Greenhouse gas</i>	<i>Included / excluded</i>	<i>Justification for exclusion or inclusion</i>
Soil Organic Carbon	CO ₂	Included (incorporated into the default sequestration values)	The determination incentivises increased soil organic carbon.
Livestock	N ₂ O CH ₄	Included	Potential for material change between baseline and project emissions.
Synthetic fertiliser	N ₂ O CO ₂	Included	Potential for material change between baseline and project emissions.
Lime	CO ₂	Included	Potential for material change between baseline and project emissions.
Residues	N ₂ O CO ₂ CH ₄	Included	Potential for material change between baseline and project emissions.
Irrigation energy	CO ₂ N ₂ O CH ₄	Included	Potential for material change between baseline and project emissions.
Non-synthetic fertiliser	N ₂ O CH ₄	Excluded	No increase in emissions between BAU use of the non-synthetic fertiliser and project emissions.

Above ground woody biomass	CO ₂	Excluded	No material change between baseline and project emissions.
Fire	CO ₂ N ₂ O CH ₄	Excluded	No material change between baseline and project emissions.
Project emissions			
<i>Carbon pool or emission source</i>	<i>Greenhouse gas</i>	<i>Included / excluded</i>	<i>Justification for exclusion or inclusion</i>
Soil Organic Carbon	CO ₂	Included	The determination incentivises increased soil organic carbon.
Livestock	N ₂ O CH ₄	Included	Potential for material change between baseline and project emissions.
Synthetic fertiliser	N ₂ O CO ₂	Included	Potential for material change between baseline and project emissions.
Lime	CO ₂	Included	Potential for material change between baseline and project emissions.
Residues	N ₂ O CO ₂ CH ₄	Included	Potential for material change between baseline and project emissions.
Irrigation energy	CO ₂ N ₂ O CH ₄	Included	Potential for material change between baseline and project emissions.
Non-synthetic fertiliser	N ₂ O CH ₄	Excluded	No increase in emissions between BAU use of the non-synthetic fertiliser and project emissions.
Above ground woody biomass	CO ₂	Excluded	No material change between baseline and project emissions.

Fire	CO ₂ N ₂ O CH ₄	Excluded	No material change between baseline and project emissions.

Division 2—Calculations—general

Subdivision 1—Calculations—general

47 Calculating the net abatement amount—overview of process

Section 47 sets out the general approach for calculating net abatement for the project.

The process for calculating the net abatement amount consists of the steps set out in section 47.

Subdivision 2—Calculating soil carbon sequestration

48 Sequestration period

Subsection 48(1) explains what the term ‘sequestration period’ means in the determination. A sequestration period is the part of a reporting period in which a project management activity is carried out in a carbon estimation area. A sequestration period can be an amount that does not consist of whole years—for example, one and a half years. A sequestration period is also the period during which emissions associated with the activity are calculated. For example, if a reporting period starts in January but the sequestration period starts in March, emissions would only be counted from March.

Subsection 48(1) clarifies that during a depletion event, no sequestration or emissions are calculated. For example, if a sequestration period for a carbon estimation area occurs from January 2015 to December 2016, but a depletion event occurs on January 2016, then no sequestration can be calculated from January 2016 until the depletion event has ended and soil carbon stocks have been restored to the levels prior to the depletion event (that is, at the end of December 2015).

Subsection 48(1) also clarifies that while not calculated during a depletion event, emissions are calculated when an activity is resumed or commenced in the carbon estimation area after the depletion event ends. This is because significant emissions could be created while the soil carbon is being replenished. These emissions are then deducted from the overall project using the net abatement equations, specifically NA3 in section 84. The emissions are deducted from the carbon estimation area sequestration after the area has reached the end of the replenishment period and is sequestering soil carbon that can be credited.

The calculations and rules for a depletion event are in Division 8 of the determination.

Paragraph 48(2)(a) clarifies when sequestration periods commence in relation to reporting periods.

Subparagraph 48(2)(a)(i) deals with the situation where a project management activity commenced in a previous reporting period, and has continued into the current period without being changed under section 85 (which sets out the rules for changing activities and actions under the determination). In that case the sequestration period is taken to have started at the beginning of the current reporting period.

Subparagraph 48(2)(a)(ii) deals with the situation where a project management activity commences during the current reporting period. In that case the sequestration period is taken to have started when the activity commences under Part 3 of the determination.

Paragraph 48(2)(b) clarifies that all sequestration periods end when the current reporting period ends.

49 Sequestration amount in each carbon estimation area

The soil carbon maps in the CFI Mapping Tool (the tool) set out an annual amount of sequestration and avoided emissions in each Statistical Area level 2 (SA2) for each project management activity undertaken in accordance with the determination. For each project management activity there is a corresponding map and three potential sequestration values depending on the SA2 in which the carbon estimation area is located. Proponents must calculate the amount of sequestration that has occurred in each carbon estimation area using the maps in the tool by identifying the activity they are undertaking in a carbon estimation area and the SA2 in which the carbon estimation area is located. The sequestration value for each project management activity accounts for both absolute increases in soil carbon as well as avoided losses of soil carbon.

Subsection 49(2) specifies how to derive the sequestration value for the relevant project management activity from the CFI Mapping Tool. The main distinction is whether or not the project management activity involves new irrigation. This is due to the potential risk of carbon leakage associated with new irrigation management actions. In some cases, where a proponent sources additional water by securing newly acquired water from an in-stream water or groundwater water access entitlement or irrigation right, a carbon leakage risk may arise. For example, if dealing with a fully allocated catchment, the entitlement may have been acquired from another irrigator resulting in displaced biomass growth. Although the project area in which the management action is undertaken will experience an increase in soil carbon, a different area of land outside of that project area may no longer be used to grow irrigated crops or pasture—potentially leading to a reduction in soil carbon that could offset project sequestration.

Given the difficulty of quantifying the magnitude of the leakage risk, and the fact that the likelihood of leakage occurring can vary considerably depending on the catchment in which the project is operating, the determination applies a flat 50% discount to sequestration arising from the use of additional water where any water is sourced from new in-stream entitlements or allocations. This factor is represented as 0.75 as there are two management actions required in the activity and the 50% discount only applies to one action. Equations SC1A and SC1B deal with this distinction.

Subsection 49(5) requires that the sequestration value be multiplied by the period (in years) that the activity was carried out in the reporting period. This may vary from six months (0.5 years) or 18 months (1.5 years), to five years. It must also be multiplied by the area of the carbon estimation area. To work out $n_{RC,x,A}$, Division 3 in Part 3 sets out when project management activities and management actions are taken to commence. Division 7 in Part 4 sets out circumstances when project management activities and management actions are taken to have ceased.

Subdivision 3—Calculating project emissions—general

Subdivision 3 sets out general requirements for calculating the project emissions from sources in the greenhouse gas assessment boundary in section 46. The emission sources are:

- (a) Livestock—section 50;

- (b) Synthetic fertiliser—section 51;
- (c) Lime—section 52;
- (d) Residue—section 53; and
- (e) Irrigation energy use—section 54.

Division 3—Calculating baseline emissions

Subdivision 1—Calculating baseline emissions—livestock

55 Livestock emissions during baseline emissions period—general

Section 55 sets out approaches for proponents to calculate baseline livestock emissions for carbon estimation areas under pasture. This is because areas under pasture will generally involve livestock grazing.

Emissions from livestock will vary from year to year in the baseline emissions period due to factors such as environmental variation and management cycles.

Section 55 sets out alternative approaches for calculating baseline livestock emissions:

- (a) a default approach using historical stocking rate data (referred to in the determination as ‘livestock baseline A’); and
- (b) an alternative approach using assessed carrying capacity (referred to in the determination as ‘livestock baseline B’).

When accounting for livestock emissions, the default approach set out in the determination (livestock baseline A) requires proponents to use annual stocking rates over the baseline emissions period to calculate the average annual emissions from livestock for each carbon estimation area under pasture. The five year baseline emissions period ensures that a reasonable amount of variability in stocking rates is captured and reflected in the baseline.

In order to screen out the effect of minor changes in stocking rate (and, hence, livestock emissions) due to environmental or other variation, section 55 provides that proponents do not have to account for changes in livestock emissions within one standard deviation from the mean annual baseline emissions. Subsection 55(5) provides that emissions above one standard deviation from the mean annual baseline emissions are considered to be materially different and must be accounted for in calculating net abatement.

In some circumstances a proponent may not be able to provide historical data to use livestock baseline A. This may be because the historical data cannot be accessed. In these cases, the proponent must calculate baseline emissions using assessed carrying capacity—that is, livestock baseline B. Under this approach a standard deviation cannot be calculated and subsection 55(7) provides that a tolerance margin of 10% must be used instead.

56 Livestock baseline A—requirements

Section 56 sets out the process for determining livestock emissions using livestock baseline A.

Subsection 56(1) specifies the formula for determining the total emissions from livestock during year *B* of the baseline emissions period for each relevant carbon estimation area. Note that species, state/region, livestock class and season (*‘gijk’*) are represented in the Standard Parameters and Emissions Factors table as a single number. This categorisation for the emission factor should be used for determining the livestock group.

Subsection 56(2) specifies the formula for determining the mean annual emissions from livestock during the baseline emissions period for each relevant carbon estimation area.

Subsection 56(3) specifies the formula for determining the standard deviation of the annual livestock emissions for the baseline emissions period for each relevant carbon estimation area. In this formula, '4' is a simplification of the standard deviation formula denominator ($n-1$, where n is 5 (the years)).

57 Livestock baseline B—general

Section 57 sets out the general requirements for determining livestock emissions using livestock baseline B. The section requires that the project proponent:

- (a) obtain an assessment of carrying capacity for the relevant carbon estimation area expressed as a total number of animal units (for example, Dry Sheep Equivalent or Animal Equivalent) from the relevant government body or authority; and
- (b) obtain an auditable description of the process that was used to calculate the carrying capacity of the relevant project area from the relevant government body.

Subsection 57(2) requires that in determining carrying capacity, any available property-specific data must be taken into account, and the assessment must be based on:

- (a) the recommended pasture utilisation rate for the relevant district;
- (b) the assessed carrying capacity being sustainable over a minimum of 10 years; and
- (c) the assumption that annual rainfall will be at the 10 year average for the relevant district.

Subsection 57(4) provides that for the purpose of calculating emissions under livestock baseline B, AU_A is the assessed annual carrying capacity of the carbon estimation area A , in animal units.

58 Livestock baseline B—requirements

Subsection 58(1) sets out the process for determining livestock emissions during the first year of the project for each relevant carbon estimation area for the purposes of livestock baseline B.

Subsection 58(3) sets out the process for determining the annual baseline emissions from livestock for each relevant carbon estimation area.

Subsection 58(4) sets out the process for determining the tolerance margin for the annual livestock emissions during the baseline emissions period for each relevant carbon estimation area.

Subdivision 2—Calculating baseline emissions—synthetic fertiliser

59 Synthetic fertiliser baseline emissions

Project proponents undertaking sustainable intensification projects where nutrient management is the management action, and proponents undertaking a conversion to pasture project, must calculate emissions from the use of synthetic fertiliser.

Section 59 sets out two approaches to calculating synthetic fertiliser emissions for the baseline emissions period. The default approach (synthetic fertiliser baseline A) requires proponents to assume a zero baseline.

If synthetic fertiliser was applied to the relevant carbon estimation area in at least three out of the five years of the baseline emissions period, then proponents may calculate baseline emissions using synthetic fertiliser baseline B.

This baseline requires that proponents calculate the mean annual emissions from synthetic fertiliser during the baseline emissions period. Changes in emissions from this source are accounted for in calculating net abatement where mean annual emissions during the reporting period vary from mean annual baseline emissions.

60 Synthetic fertiliser baseline B

Section 60 sets out the process for determining emissions from synthetic fertiliser using synthetic fertiliser baseline B.

Subsection 60(1) specifies the formula for determining nitrous oxide emissions resulting from fertiliser applied to each relevant carbon estimation area during each year of the baseline emissions period.

Subsection 60(2) specifies the formula for determining the total emissions resulting from fertiliser applied to each relevant carbon estimation area during each year of the baseline emissions period.

The formula uses the parameter EF_U which is the National Inventory Report emission factor for carbon dioxide emissions from urea, as updated from time to time. At the time of writing this was 0.73 (being the IPCC (2006) default emission factor).

Subsection 60(3) specifies the formula for determining the mean emissions resulting from fertiliser applied to each relevant carbon estimation area during the baseline emissions period as a whole.

Subdivision 3—Calculating baseline emissions—lime

61 Lime baseline emissions

Project proponents undertaking sustainable intensification where the management of soil acidity is a management action must account for emissions from lime in calculating net abatement.

Lime is generally applied infrequently to agricultural soils (often at greater than 10-year intervals) and proponents must demonstrate that the soil in the relevant carbon estimation area was acidic at the beginning of the project. It is therefore reasonable to assume that emissions from the application of lime during the baseline emissions period were negligible.

Accordingly the determination assumes that baseline emissions from this source are zero.

Subdivision 4—Calculating baseline emissions—residues

62 Residue baseline emissions—general

Emissions from residues must be calculated for the following project management activities, outlined in subsection 62(4):

- (a) stubble retention and sustainable intensification carried out on carbon estimation areas under pasture for which pasture renovation is a management action (residue baseline A);
- (b) sustainable intensification carried out on carbon estimation areas under crops (residue baseline B); and
- (c) conversion to pasture (residue baseline C).

63 Residue baseline A

For stubble retention (residue baseline A), the determination assumes that all crop residue was removed from the carbon estimation area during the baseline emissions period and, hence, that baseline emissions from this source were zero.

Similarly, the determination assumes that there were no historical emissions from pasture renovation as pastures are typically renovated at intervals of greater than 10 years. It is reasonable to assume that a renovation event would not occur both during the baseline emissions period and also at the beginning of the project.

For these project management activities and management actions, all emissions from residues must be accounted for in calculating net abatement.

64 Residue baseline B

In residue baseline B sustainable intensification as a project management activity is assumed to result in a 20% biomass increase and therefore an additional 20% of crop residue emissions.

Section 64 requires that the additional 20% of residue emissions must be accounted for in calculating net abatement.

65 Residue baseline C

Under residue baseline C, proponents must calculate the mean annual emissions from crop residues during the baseline emissions period even though there are unlikely to be any emissions from residues during the project. This is because these baseline emissions will 'offset' some of the emissions from livestock resulting from the conversion to pasture and give a more accurate estimate of the net abatement profile of the project.

Subsection 65(3) sets out the formula for determining emissions from residues from each crop that follows a tillage event and is grown in a carbon estimation area, for each year of the baseline emissions period.

'Tillage' means any form of mechanical preparation of the soil and includes ploughing, cultivation, and direct drill.

Subsection 65(4) sets out the formula for determining total emissions from residues of all crop types grown in the relevant carbon estimation area for each year of the baseline emissions period.

Subsection 65(5) sets out the formula for determining emissions from fuel used for tillage events. In this formula, n is the number of gases and is therefore equal to 3, for methane, nitrous oxide, and carbon dioxide.

Subsection 65(6) sets out the formula for determining total emissions from residues and tillage events for each year of the baseline emissions period for each relevant carbon estimation area.

Subsection 65(7) sets out the formula for determining mean annual emissions from residues and tillage for the baseline emissions period for each relevant carbon estimation area.

Subdivision 5—Calculating baseline emissions—irrigation energy use

66 Irrigation energy use baseline emissions

Emissions from energy use for irrigation (that is, diesel fuel and electricity—being the two most common sources of energy used to power irrigation infrastructure) must be calculated for sustainable intensification as a project management activity for which irrigation is a management action.

The determination provides that this management action can only be applied to areas that were not previously irrigated. Therefore baseline emissions from this source are assumed to be zero.

Division 4—Calculating project emissions

67 Project emissions—livestock

Subsection 67(1) specifies the formula for determining the emissions for each livestock group according to the number of days the group spent in the relevant carbon estimation area of the reporting period.

Subsection 67(2) specifies the formula for determining the total emissions from livestock for the reporting period for each relevant carbon estimation area.

Subsection 67(3) specifies the formula for determining the mean annual livestock emissions for the reporting period for each relevant carbon estimation area.

68 Project emissions—synthetic fertiliser

Subsection 68(1) specifies the formula for determining the nitrous oxide emissions resulting from fertiliser applied to each relevant carbon estimation area during each year of the reporting period.

Subsection 68(2) specifies the formula for determining the total emissions resulting from fertiliser applied to each relevant carbon estimation area during the reporting period.

The formula uses the parameter EF_U which is the National Inventory Report emission factor for carbon dioxide emissions from urea, as updated from time to time. At the time of writing this was 0.73 (being the IPCC (2006) default emission factor).

Subsection 68(3) specifies the formula for determining the mean annual emissions resulting from fertiliser applied to each relevant carbon estimation area during the reporting period.

69 Project emissions—lime

Subsection 69(1) specifies the formula for determining the total quantity of carbonates (CaCO_3 or $\text{CaMg}(\text{CO}_3)_2$) applied to each relevant carbon estimation area for the reporting period.

Subsection 69(2) specifies the formula for determining the quantity of carbon dioxide emissions released from applications of lime applied to each relevant carbon estimation area for the reporting period.

The formula uses the parameter EF_L which is the National Inventory Report emission factor for carbonates, as updated from time to time. At the time of writing this was 0.13 (being the IPCC (2006) default emission factor).

70 Project emissions—residues

Subsection 70(1) specifies the formula for determining the quantity of emissions released from the residues of each crop grown in the reporting period for each relevant carbon estimation area.

The formula uses the parameter EF_R which is the National Inventory Report emission factor for residues, as updated from time to time. At the time of writing this was 6.09 tonnes CO₂-e / tonne N (being the IPCC (2006) default emission factor).

Subsection 70(2) specifies the formula for determining the total quantity of emissions released from residues for each relevant carbon estimation area for the reporting period.

Subsection 70(3) specifies the formula for determining the quantity of emissions released from each pasture renewal or renovation event for the reporting period for each relevant carbon estimation area.

Subsection 70(4) specifies the formula for determining the emissions released from fuel use associated with tillage events (crop and pasture renovation events) for the reporting period for each relevant carbon estimation area.

The formula uses the parameter EF_{Fg} which is the emission factor for each gas type g , being carbon dioxide, methane or nitrous oxide. At the time of writing the values for EC_F and EF_{Fg} were set out in ‘Fuel combustion—fuels for transport energy purposes’ of ‘Schedule 1—Energy content factors and emission factors’ to the NGER Measurement Determination.

Subsection 70(5) specifies the formula for determining the total emissions released from all residues and tillage events for the reporting period for each relevant carbon estimation area.

71 Project emissions—irrigation energy use

Proponents undertaking sustainable intensification as a project management activity where irrigation is a management action are required to calculate emissions from energy used to irrigate each relevant carbon estimation area.

Section 71 provides equations to calculate emissions arising from both fuel use and electricity use. Proponents must use either or both as applicable to each relevant carbon estimation area.

Subsection 71(2) specifies the formula for determining the emissions released from fuel use associated with irrigation for each relevant carbon estimation area for the reporting period.

Subsection 71(3) specifies the formula for determining the emissions released from electricity use associated with irrigation for each relevant carbon estimation area for the reporting period.

Division 5—Calculating total change in emissions

Subdivision 1—Calculating total change in emissions—livestock

Subdivision 1 provides equations for calculating the total change in livestock emissions.

Section 72 provides that the material difference must be calculated using whichever of Equations LS10 and LS11 apply.

If the mean annual livestock emissions for the reporting period are greater than the mean annual livestock emissions for the baseline emissions period, then Equation LS10 in section 73 must be used to calculate material difference.

If the mean annual livestock emissions for the reporting period are less than the mean annual livestock emissions for the baseline emissions period, then Equation LS11 in section 74 must be used to calculate material difference.

Section 75 specifies the formula for determining the change in livestock emissions for the reporting period for each relevant carbon estimation area.

Subdivision 2—Calculating total change in emissions—synthetic fertiliser, lime, residues and fuel

Subdivision 2 provides equations for calculating the total change in the other emissions sources relevant to the determination: synthetic fertiliser, lime, residues and fuel.

Division 6—Calculation of the carbon dioxide equivalent net abatement amount

Division 6 provides equations for calculating the net abatement for a project area.

Section 81 specifies the formula for determining the net change in emissions for each carbon estimation area. Subsection 81(2) clarifies that if an emissions source is not relevant to a carbon estimation area, then the value for that parameter must be zero.

Subsections 81(3) and (4) refer to $\Delta E_{ALL,RC-1,A}$. If there are fewer emissions in the project than during the baseline, this will result in negative emissions. When this occurs, the value is zero for the purposes of the calculations. This is because the negative emissions would result in greater net abatement but not due to the sequestration activity. The negative emissions may, however, be considered in the next reporting period where the negative emissions may balance out the emissions for that period. This allows for fluctuations in emissions between reporting periods.

Section 82 specifies the formula for determining the net change in emissions for the project.

Section 83 specifies the formula for determining the sequestration for each carbon estimation area in the project.

Section 84 specifies the formula for determining the net abatement across the project. If emissions are greater than sequestration then the net abatement will be a negative value. For the purposes of the calculations this is taken to be zero. However, these emissions need to be considered in the next reporting period to ensure they are accounted for. $NA_{RC-1,Proj}$ represents this carry-over amount.

Division 7—Changing project management activities or management actions

85 Limitations on changing activities or actions

Section 85 sets out the limited circumstances in which it is possible to change from one project management activity or management action to another.

The effect of section 85 is that it is not possible to change to a project management activity with a lower sequestration value than the activity currently carried out in the carbon estimation area. Sequestration values for activities are derived using the CFI Mapping Tool. For example, the sequestration value for a stubble retention project management activity is lower than the value for a conversion to pasture activity. This means that a proponent is not able to change from conversion to pasture to stubble retention, but could change from stubble retention to conversion to pasture. The proponent is also not able to change from sustainable intensification to stubble retention or conversion to pasture.

Subsection 85(2) provides that an activity in a carbon estimation area must not change before the reporting period ends. The effect of subsection 85(2) is that an activity must change only at the start of a new reporting period. This is because the project management activity is the basis of sequestration calculations for a reporting period and therefore needs to remain the same throughout the period.

Subsection 85(3) provides that management actions carried out as part of a sustainable intensification project management activity must not change part way through a reporting period. The effect of subsection 85(3) is that a management action within a sustainable intensification project management activity should only change at the start of a new reporting period.

Subsection 85(4) provides that if an activity or action is changed, the new activity or action must meet the relevant eligibility requirements set out in Division 3 of Part 3.

86 When management action is taken to have ceased in carbon estimation area with pasture

Section 86 provides that the management action of establishing, renovating, or maintaining pasture will be taken to have ceased if a depletion event occurs under section 89 due to the presence of bare soil in the carbon estimation area.

The action will be taken to have ceased when the depletion event commences. The commencement of the depletion event is determined under subsection 89(3).

The presence of bare soil in carbon estimation areas where these actions are undertaken is the main indication that soil carbon is likely to be depleting and that the actions are no longer taking place.

87 When other activity or action is taken to have ceased in carbon estimation area

Section 87 sets out situations in which project management activities or management actions that are not covered by section 86 will be considered to have ceased in a carbon estimation area.

In general, if a management action is no longer being carried out in accordance with the requirements of Division 3 of Part 3, then the action will be taken to have ceased under section 87 and a depletion event will be taken to have occurred (section 88). This is because the FullCAM modelling used to derive the sequestration values assumed that the relevant management intervention would continue for the entire permanence period of the project. According to the carbon dynamics used in FullCAM, once an action ceases the increased carbon flows cease and the soil carbon stocks will return to BAU levels.

Accordingly, subsections 87(1) and (2) provide that if a proponent fails to apply nutrients or lime at the times specified in Division 3 of Part 3, the relevant management action will be taken to have ceased.

Subsection 87(3) sets out the general rule for when new irrigation will be taken to have ceased as a management action in a carbon estimation area. There are, however, some circumstances when applying water to the carbon estimation area may not have been necessary to support increased biomass. For example high rainfall or flood conditions may make the application of further water via irrigation unnecessary or even environmentally unsound. Subsection 87(4) specifies that, if additional water is not applied during a year because environmental conditions mean the water would not improve yields, the management action will not be taken to have ceased. The note to subsection 87(4) points out that proponents are required to keep records that demonstrate that such a situation has occurred.

Evidence of this situation may include seasonal or annual rainfall records, soil moisture tests or advice from relevant specialists.

Subsection 87(5) clarifies that sustainable intensification will cease as a project management activity in a carbon estimation area if one or both management actions that make up the activity cease. The effect of subsection 87(5) is that the activity as a whole will cease even if only one of the two nominated actions has ceased.

Subsection 87(6) specifies that ‘nominated’ in relation to management actions has the same meaning as the phrase ‘nominated management action’ defined in section 25. Section 25 provides that a management action in a sustainable intensification project management activity will be a ‘nominated management action’ if it is:

- (a) nominated in accordance with section 17; or
- (b) changed in accordance with section 85.

Subsection 87(7) sets out the circumstances in which the project management activity of stubble retention will be taken to have ceased. This is where more than one stubble removal event occurs in a period of five years that the relevant land is under crops. Subsection 87(7) provides that if more than one stubble removal event occurs on such land in that time, stubble retention will be taken to have ceased as a project management activity.

Subsections 87(8) and (9) specify the point at which project management activities are taken to cease under section 87.

Subsection 87(8) provides that a sustainable intensification project management activity will be taken to have ceased at the beginning of the sequestration year in which the activity stopped. This generic cease time takes into account the possible variation in times when the relevant management action should have been undertaken. For example, a nutrient management strategy may not require nutrients to be applied to a carbon estimation area on any particular date. If, however, nutrients have not been applied by the end of the current sequestration year, the action (and therefore the sustainable intensification activity as a whole) is taken to have ceased. The depletion event is then taken to have started at the beginning of the current sequestration year.

Subsection 87(9) specifies that stubble retention ceases as a project management activity when a second stubble removal event begins within five years that the land is under crops.

Subsection 87(10) clarifies the meaning of ‘sequestration year’. In particular it sets out when a sequestration year begins for any sustainable intensification, stubble retention or conversion to pasture project management activity. The effect of subsection 87(10) is that a sequestration year is specific to each project management activity. For example, if a sustainable intensification activity commences on 1 September 2015 with the application of both fertiliser and lime, the sequestration period for this activity starts on 1 September, and therefore 1 September is the start and anniversary of the sequestration year.

88 Ceased activity or action taken to be depletion event

Section 88 provides that the cessation of a project management activity or management action under section 87 will result in a depletion event occurring in the carbon estimation area.

Division 8—Carbon depletion

89 Bare soil

Section 89 provides that a carbon estimation area must not have more than 30% bare soil, or less than 70% vegetation groundcover, for more than three consecutive soil monitoring periods during the project. A soil monitoring period is three months.

This is because land that does not have vegetation groundcover is at high risk of losing carbon rich topsoil through erosion. Erosion events can offset or potentially even reverse any gains of soil carbon from sequestration and are challenging to quantify accurately.

The determination does not specify particular activities that may lead to bare soil, as it is up to the proponent to manage factors that affect groundcover such as grazing intensity, the effect of seasonal conditions, and the use of crop residues.

Subsection 89(1) provides that if land is either without the specified level of groundcover or the ground cover is not monitored for three consecutive monitoring periods, then a depletion event is taken to have occurred on that land. Vegetation groundcover is relatively straightforward to monitor and a lack of groundcover can have a significant effect on net abatement. The consequences of not monitoring vegetation groundcover as specified in subsection 89(1) are therefore reasonable.

Subsection 89(2) clarifies that such a depletion event cannot occur in the first sequestration year in which pasture renovation or conversion to pasture is undertaken in a carbon estimation area. This is because the determination allows up to 12 months for pasture to be established after the pasture is first seeded or re-seeded (see subsection 36(4)).

Subsection 89(5) specifies that a ‘soil monitoring period’ is the period set out in subsection 99(2). Subsection 99(2) refers to a three-month period.

90 Depletion and replenishment events—requirements

A depletion event is defined in the determination as being an event which is taken to result in the reversal of sequestration from the eligible offsets project in accordance with:

- (a) section 88, which deals with ceasing project management activities or management actions; or
- (b) subsection 89(1), which deals with bare soil.

Subsection 90(1) specifies that soil carbon stocks are considered to have reversed at an annual rate of one-seventh of the total sequestration achieved in the project. This predetermined rate approximates the soil carbon dynamics built into FullCAM and serves to give clarity to proponents and to the Regulator about how to calculate the effect of a depletion event. On the basis of these calculations, the Regulator may determine whether a ‘significant reversal’ has occurred under the *Carbon Credits (Carbon Farming Initiative) Regulations 2011* (regulations) or the legislative rules.

For the purposes of subsection 90(1), total sequestration is determined from the project declaration date even for project areas that were added to the project after this time. This approach is considered to be conservative.

Subsection 90(2) sets out certain circumstances in which a depletion event is considered to have stopped.

Paragraph 90(2)(a) provides that if the depletion event occurred due to the cessation of a project management activity or management action in the carbon estimation area, then the depletion event will be taken to have stopped when the activity and actions that were being

carried out immediately before the depletion event occurred are resumed, or a new activity and actions are begun.

Paragraph 90(2)(b) provides that if the depletion event occurred due to bare soil or a failure to monitor for three consecutive monitoring periods (of three months each), the depletion event will be taken to have stopped when monitoring resumes and the carbon estimation area does not have bare soil.

Subsection 90(3) specifies that if a depletion event does not stop in accordance with subsection 90(2), then it will stop after seven years. Subsection 90(3) in effect sets a maximum period for depletion events. After seven years, the soil carbon stocks prior to the depletion event will have been exhausted. It is not possible under the determination to reduce stocks below this level. While the depletion event may have stopped for the purposes of the depletion calculations, it does not necessarily mean that soil carbon stocks may recover from this point. The requirements in subsection 90(4) must be met in order for soil carbon stocks to begin to recover.

Subsection 90(4) clarifies when soil carbon stocks begin to recover after a depletion event ends.

Paragraph 90(4)(a) deals with depletion events due to bare soil or a failure to monitor groundcover. If the depletion event stops and a project management activity was undertaken in the carbon estimation area during the event, then replenishment will begin when both monitoring resumes and the area does not have bare soil.

Paragraph 90(4)(b) provides that in all other situations, replenishment will begin when a project management activity is resumed or commenced in the area. Note that if a project management activity is not undertaken in the area until some time after soil carbon stocks are exhausted, the stocks will begin to replenish when the activity commences or is resumed.

91 Calculation of carbon depletion

Section 91 sets out the treatment to be applied to a carbon estimation area that undergoes a depletion event.

The effect of section 91 is that carbon estimation areas undergoing a depletion event must not be counted as part of the project's net abatement calculations from the time that the depletion event commences until the amount of sequestered carbon for the area reaches the total amount sequestered up until the day before the depletion event. This is to ensure that the effect of the depletion can be accounted for separately to the rest of the relevant project area.

Subsections 91(3)–(6) set out parts of the determination that are affected if a depletion event occurs in a carbon estimation area.

Subsection 91(3) specifies that the boundaries of a carbon estimation area cannot be changed during a depletion event and subsequent replenishment period.

Paragraph 91(4)(a) clarifies that when calculating sequestration, a sequestration period will not include any part of a reporting period that overlaps with a depletion or replenishment period.

Paragraph 91(4)(b) clarifies that when calculating emissions, a sequestration period will not include any part of a reporting period that overlaps with a depletion period. This means that emissions are not calculated if the relevant activity is not taking place. However, emissions must be calculated when an activity commences or is resumed at the start of the replenishment period. Emissions for the carbon estimation area will be calculated until, and including, EALL1 (subsection 81(1)). When the first offsets report is submitted after the

replenishment period, these emissions will be included.

Paragraph 91(5)(a) specifies that emissions do not have to be calculated when there is no sequestration period in a reporting period for a carbon estimation area.

Paragraph 91(5)(b) specifies that, when calculating the net change in emissions for each carbon estimation area in the project (EALL1), the total change in emissions from all sources for the reporting period for the area ($\Delta E_{All,Rc,A}$) is taken to be zero.

Subsection 91(6) provides an exception to the rule in subsection 85(1) which allows project management activities and management actions to be changed in certain circumstances.

Subsection 91(6) specifies that a project management activity or management action must not change in a carbon estimation area during a replenishment period. This means that once a depletion event is over, it is possible to undertake an activity that is different from the activity undertaken when the depletion event occurred. In order to allow time for the activity to have an impact on soil carbon, only one activity may be undertaken during a replenishment period.

Subsection 91(7) specifies how to calculate the amount of sequestered carbon across the carbon estimation area that is undergoing the depletion event. This amount must be used in the equations that follow.

Subsection 91(8) specifies how to calculate the total accumulated carbon sequestration for the relevant carbon estimation area A . This involves calculating the sequestration based on the most recent project management activity and the years the project has been underway.

Subsection 91(9) reflects the rate of decline of sequestration for a carbon estimation area in which a depletion event has occurred. This is a rate of $1/7^{\text{th}}$ of the total accumulated carbon sequestration per year.

Subsection 91(10) specifies what happens to sequestration levels at the end of the seven-year period after a depletion event began in a carbon estimation area. If the depletion event has not already stopped, the event is considered to have stopped at this point as the area will have returned to its BAU levels and cannot deplete below this level.

Subsection 91(11) specifies how to calculate the period required to replenish carbon to the level before the depletion event began. The proponent must undertake the project management activity in accordance with the determination for the duration of the replenishment period to ensure soil carbon returns to the total accumulated carbon sequestration. The formula in subsection 91(11) (Equation D4) enables the proponent to calculate how long the replenishment period will be.

Part 5—Reporting, notification, record-keeping and monitoring requirements

The record-keeping requirements in the determination ensure that the activities that occurred in a project area during the baseline emissions period and the project period can be proven to the satisfaction of the Regulator.

The record-keeping requirements must also establish ‘newness’, support net abatement estimates, and verify that the project management activities have been undertaken in accordance with the determination.

There is no requirement for records to be kept in hard-copy format. It is acceptable for the records to be kept electronically.

Division 1—General

92 Operation of this Part

Subsection 106(3) of the Act provides that a methodology determination may require the project proponent of an eligible offsets project to comply with specified reporting, notification, record-keeping and monitoring requirements.

Under Parts 17 and 21 of the Act a failure to comply with these requirements may constitute a breach of a civil penalty provision, and a financial penalty may be payable.

The reporting, notification, record-keeping and monitoring requirements specified in a methodology determination are in addition to any requirements specified in the Act, regulations, and legislative rules.

Division 2—Reporting requirements

93 Offsets reports requirements—review of strategies

Division 3 of Part 3 of the determination sets out various requirements to review strategies for management actions.

Section 93 requires a project proponent to include in an offsets report evidence that shows that a strategy review has occurred as required under Division 3 of Part 3.

94 Offsets reports requirements—determination of certain factors and parameters

The offsets reporting requirements in section 94 apply where it is not possible to meet the requirements of subsection 7(1), as outlined in paragraph 7(2)(b).

The purpose of section 94 is to provide the Regulator with information on which version of any relevant external source has been used by a project proponent to define or calculate a factor or parameter set out in the determination. The proponent is required to detail in the offsets report the version of the external source that was used, the dates that the version was used, and why it was not possible for the proponent to use the version that was in force at the end of the reporting period.

95 Offsets reports requirements—changing carbon estimation areas

Section 95 requires that details about changes to the number or boundaries of carbon estimation areas in the project must be included in the next offsets report that reports on the carbon estimation areas provided to the Regulator after the changes are made. The report must be accompanied by the map specified in subsection 15(4). The map must show each carbon estimation area in a project area.

96 Offsets reports requirements—depletion events

Paragraphs 96(a) and (b) provide that a proponent must set out in the relevant offsets report the start and end dates of any depletion event that occurred, or is taken to have occurred, during a reporting period.

Paragraph 96(c) requires that information about the nature of the event be provided in the report. Information about the nature of a depletion event could include whether the event was ‘human-made’ or caused by natural conditions.

Paragraph 96(d) requires that the proponent specify in the report the relevant provision in the determination under which the depletion event is taken to have occurred (for example, section 88 or subsection 89(1)).

Division 3—Notification requirements

97 Notification of Regulator

Paragraph 106(3)(b) of the Act provides that a methodology determination may specify requirements to notify the Regulator of one or more matters relating to the project.

For the purposes of paragraph 106(3)(b), section 97 of the determination sets out when project proponents must notify the Regulator.

Subsection 97(1) provides that proponents must notify the Regulator if they cease carrying out an eligible project management activity or management action before the nominated 25-year or 100-year permanence period has ended. In this case, proponents must notify the Regulator within 30 days after the activity or action has stopped.

Subsection 97(2) provides that proponents must also notify the Regulator within 30 days after an activity or action is changed.

Subsection 97(3) provides that proponents must notify the Regulator if a depletion event occurs in a carbon estimation area. In this case, proponents must notify the Regulator within 30 days after the depletion event began.

Subsection 97(4) requires that the start and end date of a depletion event be included in the notification of the event to the Regulator.

Division 4—Record-keeping and project monitoring requirements

98 Records that must be created and kept

Section 98 sets out specific record-keeping requirements for soil carbon projects.

99 Record keeping and project monitoring—vegetation groundcover

Section 99 requires that every three months proponents monitor a carbon estimation area to ensure that the level of groundcover within the area does not drop below 70%. This aligns with the requirements in section 89 regarding bare soil.

Section 99 sets out a general process for monitoring and reporting on groundcover. The general elements of a monitoring protocol are set out in the section, but proponents have the flexibility to design a process to suit their circumstances. The primary concern is that a consistent and replicable method is used so that changes in groundcover over time are detected.

100 Project monitoring—livestock

Section 100 sets out monitoring requirements for livestock so that changes in emissions from this source can be calculated in accordance with Part 4 of the determination.

101 Project monitoring—other parameters

Section 101 lists parameters that require monitoring, including specifications for the procedure and frequency of monitoring, and how to derive the parameter value based on measurements and monitoring data.

A failure to monitor parameters in accordance with Division 4 of Part 5 is a breach of the requirements of the determination. In the case where it has not been possible to monitor certain parameters in accordance with the requirements, a project proponent should use one of the approaches set out in section 103.

102 Consequences of not monitoring livestock

Section 102 sets out the consequences of not monitoring livestock in accordance with the monitoring requirements under the determination.

Subsection 102(1) provides that if a proponent fails to monitor livestock in a carbon estimation area for a period of time in a reporting period (the ‘non-monitored period’), then the abatement for the area during the non-monitored period is taken to be zero.

Livestock numbers are relatively straightforward to monitor and can have a significant effect on net abatement. The consequences of not monitoring livestock numbers are therefore considered to be reasonable.

Subsection 102(2) clarifies that section 102 does not prevent the Regulator from taking action under the Act or subordinate legislation in response to the proponent’s failure to monitor vegetation groundcover or livestock in accordance with the monitoring requirements in the determination.

The note to subsection 102(2) sets out examples of actions that the Regulator may take under the Act in response to a failure to comply with the determination’s monitoring requirements.

The Regulator may also determine an appropriate response within its compliance and enforcement framework depending on the nature of the non-compliance (i.e. whether it is a one-off minor event or a more significant or repeated breach). This could include determining that no eligible net abatement has been achieved by the project for the period of the breach.

103 Consequences of not meeting requirement to monitor certain parameters

Compliance with requirements for monitoring parameters is important to ensure that credited abatement is calculated correctly. The monitoring requirements in Division 4 of Part 5 include the procedures for monitoring.

In some cases a project may be unable to meet the specified requirements regarding a particular parameter. When this occurs section 103 identifies the actions that must be undertaken for the time intervals in which the parameters were not monitored as required (the ‘non-monitored period’). Where the parameters are relatively straightforward to monitor and have a significant effect on net abatement (items 1, 2 and 3 in the table in section 103), the abatement for the non-monitored period is taken to be zero. This approach is necessary to ensure that all estimates or assumptions used in the determination are conservative and are in accordance with the offsets integrity standards outlined in section 133 of the Act.

If the parameters listed in item 4 of the table in section 103 are not monitored, the proponent must make a conservative estimate of the parameter for the duration of the non-monitored period.

Division 5—Reporting under section 77A of the Act

104 No division of carbon estimation area

Section 77A of the Act provides that a project may be divided into two or more specified parts for the purpose of reporting.

Section 104 of the determination specifies that if a project is divided, this cannot involve division of a carbon estimation area. This ensures that project management activities are overseen at a carbon estimation area level.

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—Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015

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— Estimating Sequestration of Carbon in Soil Using Default Values) Methodology Determination 2015* (the determination) sets out the detailed rules for implementing and monitoring offsets projects that sequester carbon in agricultural soils using:

- (a) certain types of management actions on project land; and
- (b) modelled estimates of sequestration.

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.

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.

Greg Hunt, Minister for the Environment