Australian Government
Clean Energy Regulator

CLEAN ENERGY REGULATOR

Guidelines on stratification, evidence and records

For projects under the Human-Induced Regeneration of a Permanent Even-Aged Native Forest and Native Forest from Managed Regrowth methods

8 May 2019

Contents

Executive summary

The Human-Induced Regeneration of a Permanent Even-Aged Native Forest (HIR) and Native Forest from Managed Regrowth (NFMR) methods (the methods) are modelled methods. The methods set out how abatement is credited for registered Emissions Reduction Fund projects by applying estimation formulae over carbon estimation areas (CEAs), which are generally very large areas of land.

While the methods are model based, they require additional evidence to justify that the inputs to the models are valid. Amongst other eligibility criteria, the CEAs are required to exclude forested areas and land that is being used for non-project purposes. The land included in CEAs must also have the potential to regenerate forest cover—demonstrating continuing regeneration over time, as a result of undertaking eligible project activities.

In administering projects under these methods, the Clean Energy Regulator recognises the data limitations inherent in measuring and assessing forest potential—particularly for the initial CEA stratification. These data limitations are factored into administrative practices to ensure that the methods are practical for proponents at reasonable cost. As time progresses, uncertainty about forest potential in CEAs can be reduced through collecting different types of evidence to measure the actual progression of regeneration over time.

These guidelines support the requirements in the Carbon Credits (Carbon Farming Initiative) Amendment Rule (No.2) 2018 (the 2018 CFI Rule amendments), the Carbon Credits (Carbon Farming Initiative) Amendment Rule (No.1) 2019 (the 2019 CFI Rule amendments) and key method eligibility requirements, incorporating assessment practices currently in use by some proponents. It is expected that the due diligence process and procedures provided in these guidelines will be applied to both HIR and NFMR projects, consistent with legislative requirements.[1]

These guidelines are designed to provide information on the approach that the Clean Energy Regulator will take in administering the requirements for CEA eligibility for all projects operating under the HIR and the NFMR methods. Administration by the Clean Energy Regulator underpins the legal requirements of the HIR and NFMR methods and principles of the *Carbon Credits (Carbon Farming Initiative) Act 2011* (CFI Act) to ensure Australian carbon credit units (ACCUs) issued under the Emission Reduction Fund represent genuine abatement. The CFI Rule requires project proponents to take into account these Guidelines when stratifying CEAs for all projects under the HIR and NFMR methods.

These Guidelines are in two parts: *Part A: Overview* and *Part B: Process and procedures*. They set out procedures for when and how forest cover and regeneration should be evidenced to the satisfaction of the Clean Energy Regulator, in order to meet requirements of both the HIR and NFMR methods and other legislation, including the 2018 and 2019 CFI Rule amendments.[2] The Clean Energy Regulator consulted with industry and technical experts on the best way to clarify administration of methods to develop the technical process and procedures detailed in these guidelines.

The technical procedures outlined in these guidelines provide a standardised approach to mapping vegetation classes with the aim of defining eligible areas and monitoring progress toward forest cover. The guidelines also outline expected data collection and evidence to support claims. Proponents are expected to select techniques that best increase certainty in their situation for assessing pre-existing forest cover, the forest potential and its

[1] The 2018 CFI Rule amendment applies to HIR projects and NFMR projects that contain land that has been transferred from HIR projects. The 2019 CFI Rule amendment extends the 2018 CFI Rule amendment to NFMR projects and makes certain other changes applying to both HIR projects and NFMR projects.

[2] Section 9AA of the CFI Rule requires that CEAs of projects under HIR and NFMR methods must achieve forest cover by a specified point in the project. Sections 3.4 and 3.5 of HIR 2013 require that CEAs must be re-stratified as exclusion areas if regeneration is heterogeneous or absent or fails to regenerate. Section 18(3) of HIR 2016 and 2018 requires that the CEAs must be re-stratified to remove CEA parts if they can no longer be reasonably expected to become native forest through regeneration or attain forest cover. NFMR projects are required to re-stratify CEAs to remove land that loses forest potential or fails to regenerate (s3.6(5)).

subsequent regeneration toward forest cover (collectively forest regeneration) and attainment of forest cover. The Clean Energy Regulator will require project proponents to apply consistent procedures to both identify pre-existing forest cover and forest cover achievement. The guidelines give proponents the option to choose technical procedures that best fit their needs. Proponents can choose to use geospatial tools where they are cost effective and accessible, use approved change detection products approved by the Clean Energy Regulator, or alternatively, undertake on-ground assessments.

It is expected that projects that have not yet reported and been issued credits will meet the requirements of these guidelines in the first report submitted. These guidelines also set out administrative arrangements for projects that have previously reported, including a pragmatic approach that will be taken in situations where additional evidence is required to meet these guidelines.

Disclaimer

These guidelines do not replace nor supersede the legal requirements of the Emissions Reduction Fund legislation, and do not address all requirements in the legislation and supplementary documents. These guidelines set out the Clean Energy Regulator's view on the interpretation of the legislation for the purposes of stratifying CEAs under the HIR and NFMR methods, and Clean Energy Regulator expectations for data collection and reporting to justify CEA stratification and associated claims for ACCUs.

Part A: Overview

Introduction

Estimating carbon abatement of dynamic vegetation systems over large areas[3] and over long time-periods raises inherent data limitation issues and can be complex. In the early years of a project, forest cover is easier to identify and assess than forest potential[4]. This is because in the early years of a project, forest potential may initially arise as relatively patchy regrowth that may not always attain forest cover over time. Uncertainty for forest potential reduces over time as regeneration progresses.

The accuracy of abatement estimates relies on proponents undertaking appropriate due diligence in meeting the initial and re-stratification requirements of the methods. Part of this due diligence—as required under the HIR and NFMR methods—includes the provision and keeping of certain records that evidence CEA eligibility.

The Clean Energy Regulator expects that in undertaking appropriate due diligence to stratify and re-stratify CEAs, only areas that have forest potential are included. The Clean Energy Regulator will require project proponents to apply consistent procedures to both identify pre-existing forest[5] cover and demonstrate forest cover achievement in accordance with the 2018 and 2019 CFI Rule amendments. Proponents must actively manage the project by undertaking eligible activities to ensure that the CEAs continue to progress toward and achieve forest cover. Confidence in abatement estimates increase where there is evidence that sufficient project activities are being carried out. Pauses in regeneration should be modelled when calculating the carbon stock to reflect events where progress to forest cover has temporarily stopped or declined, such as during drought[6]. These guidelines outline how the Clean Energy Regulator expects proponents will demonstrate compliance with these requirements, specifically regarding appropriate stratification of CEAs.

Understanding key legislative requirements of the methods and CFI Rule

This section outlines some of the key requirements of the methods and the 2018 and 2019 CFI Rule amendments relating to stratification, evidence collection, and record keeping. It also summarises the Clean Energy Regulator's expectations in how compliance with these requirements will be demonstrated, as expanded on in Part B of these guidelines, which provide technical procedures to be followed when demonstrating that these requirements have been met. Included within Part B are proposed complementary changes to the CFI Mapping Guidelines that are expected to be included over time that support method requirements, the 2018 and 2019 CFI Rule amendments and these guidelines.

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[3] HIR and NFMR project area sizes can range from less than 500 hectares up to over 300,000 hectares with a median project area of approximately 15,000 to 20,000 hectares.

[4] The terms forest cover and forest potential have the meaning given to them in the methods.

[5] "**Pre-existing forest cover**", means the forest cover that is required to be excluded from a project CEA, as defined by the specific requirements of the relevant version of the method, particularly:

- HIR 2016 and 2018 projects—CEAs must exclude areas with forest cover in the baseline period, as provided in s4(1)(a), unless the project or a project area transitioned from an NFMR project to a HIR project and meets the requirements in s5(1).
- HIR 2013 and 2015 projects—CEAs must not have had forest cover at project commencement, as provided in s3.5(1)(a), and the land must meet the zero baseline test set out in s2.4 of HIR 2013 and 2015.
- NFMR 2013, 2015 and 2018 projects—CEAs must exclude areas with forest cover when the project mechanism is implemented, as provided in s2.4(5)(c)

[6] Refer to the "Guidance for using the Full Carbon Accounting Model in Human Induced Regeneration Projects" for information on modelling growth pauses.

Appropriate stratification of CEAs for HIR and NFMR projects

Stratification refers primarily to demarcating the boundaries of CEAs from ineligible and non-implementation areas within a project area. A CEA is an area of land within a project area where the project activity or activities are being carried out to sequester carbon—for example, the cessation of mechanical or chemical suppression to enable regeneration of vegetation to forest—and for which ACCUs can be credited. The project area must be stratified into one or more CEAs before submitting the first offsets report for the project. It may be prudent to voluntarily apply elements of these guidelines prior to project registration, as a form of due diligence to ensure future abatement is evidence based.

Robust CEA stratification is necessary to meet the underlying assumptions of the Full Carbon Accounting Model (FullCAM) and the Reforestation Modelling Tool (RMT) respectively used in the methods and to ensure crediting and abatement align. Exclusion of pre-existing forest cover and ensuring forest potential is present are core requirements that proponents must consider when stratifying CEA boundaries to ensure abatement as a result of the project is accurately calculated in accordance with the methods.

Key requirements for CEA stratification for HIR and NFMR projects include the following elements, explained at greater length below:

- excluding pre-existing forest cover and seeking Clean Energy Regulator approval of procedures where applicable
- excluding land without forest potential, including:
  - » land that does not demonstrate continuing regeneration towards forest cover, and
- demonstrating attainment of forest cover.

Proponents need to stratify their initial CEAs and re-stratify them as needed—with due diligence and in-line with these guidelines. The Clean Energy Regulator recommends that proponents conservatively exclude potentially ineligible land, following the processes outlined in these guidelines, to limit the risk that they will later need to relinquish credits.

Excluding pre-existing forest cover and seeking approval of procedures

The HIR and NFMR methods both credit on the basis of an area[7] which has no pre-existing forest cover, regenerating back to forest cover through undertaking an approved activity or activities as an Emissions Reduction Fund project. Therefore, it is a fundamental requirement of all versions of the HIR and NFMR methods, that areas that meet the definition of pre-existing forest cover are not included in CEAs, as per the specific requirements of the relevant version of the method, particularly:

- HIR 2016 and 2018 projects—CEAs must exclude areas with forest cover in the baseline period[8], unless the project or a project area transitioned from an NFMR project to a HIR project and meets the requirements in s5(1).
- HIR 2013 and 2015 projects—CEAs must not have had forest cover at project commencement[9], and the land must meet the zero baseline test set out in s2.4 of HIR 2013 and 2015.
- NFMR projects—CEAs must exclude areas with forest cover when the project mechanism is implemented[10].

[7] All areas must be within a project area, as per the project declaration. For an area to be eligible for credits it must be stratified into a CEA in accordance with method rules and meet all legislative requirements.
[8] s4(1)(a) of HIR 2016 and 2018
[9] s3.5(1)(a) of HIR 2013 and 2015
[10] s2.4(5)(c) of NFMR 2013, 2015 and 2018

Under the methods, land meets the forest cover definition[11] if the:

- land has an area of at least 0.2 of a hectare, and
- vegetation on the land includes (NFMR 2013, 2015 and 2018, and HIR 2013 and 2015), or has (HIR 2016 and 2018), trees that are two metres or more in height and provide crown cover of at least 20 per cent of the land.

For HIR 2013 and 2015, proponents must create and maintain records that evidence that CEAs did not have forest cover at the end of the baseline period and have forest potential[12] across the CEA.

For HIR 2016 and 2018, proponents must make and keep records which evidence that CEAs did not have forest cover in the baseline period (unless projects/project areas transitioned from an NFMR project to a HIR project and meet the requirements of s5(1)), and have forest potential[13] across the CEA.

For NFMR projects, proponents must create and maintain records that evidence that regrowth did not achieve forest cover before the change in land management in each CEA and evidence forest potential[14].

For all HIR and NFMR methods, s 9AA(5)(aa)(ii) of the CFI Rule requires the approval of the Clean Energy Regulator to be obtained for data sources and data processing approaches used to demonstrate that a CEA has attained forest cover, such approval to be provided having regard to the equivalency and consistency requirements of s 9AA(5)(aa)(i). This approval is required where attainment of forest cover is not demonstrated on the basis of the most recent version of maps that form the basis of the National Inventory Report in accordance with s 9AA(4)(a) of the CFI Rule. Once an approval is obtained and relied upon, it applies until such time as the project proponent obtains and relies upon Clean Energy Regulator approval for new data sources and data processing approaches. A key requirement to gain approval will be an expectation that the new procedure must improve the accuracy of forest detection and the CEA must not include any pre-existing forest identified using the new approach.

Evidence of forest cover

The Clean Energy Regulator notes that proponents have to date substantially relied on the use of the maps that form the basis of the National Inventory Report to determine pre-existing forest cover for the purposes of excluding it from CEAs. In many cases, the use of higher resolution data at the project scale can improve upon the precision of this national-scale dataset. The National Inventory Forest Extent Data is subject to continuous improvement, and this may include future adoption of higher resolution satellite imagery. The methods do not specify that the maps that form the basis of the National Inventory Report is the exclusive means to determine the absence or presence of pre-existing forest cover and going forward we do not consider the maps that form the basis of the National Inventory Report sufficient to determine the absence or presence of pre-existing forest at initial stratification, without supporting evidence.

Whether the maps that form the basis of the National Inventory Report or Clean Energy Regulator approved approaches, data sources and data processing approaches are used to evidence forest cover attainment, the Clean Energy Regulator will require project proponents to apply consistent data sources and procedures to both identify pre-existing forest cover and to evidence forest cover attainment[15]. Use of a consistent methodology provides a fair metric to ensure that only detected change in forest cover is credited under these methods. Proponents are able to adopt more accurate methodologies to identify pre-existing forest in their CEAs over time while retaining the option to apply the most contemporary maps that form the basis of the National Inventory Report to evidence forest cover attainment in accordance with s9AA(4)(a) of the CFI Rule. Any methodology must conform to the procedures and reporting requirements outlined in Part A and B of these Guidelines and be approved by the Clean Energy Regulator.

[11] s1.3 of HIR 2013 and 2015 | s3 of HIR 2016 and 2018 | s1.3 of NFMR 2013, 2015 and 2018
[12] s5.4(g) and s5.5(a) of HIR 2013 and 2015
[13] s41(2)(c) and (e) of HIR 2016 and 2018
[14] s5.4(b) and s 5.5(a)(iii) of NFMR 2013, 2015, and 2018
[15] S9AA(4) of the CFI Rule.

The Clean Energy Regulator notes that a number of project proponents have developed their own procedures that have successfully identified areas of forest at a project level. Detailed assessments of these CEAs confirm that robust CEA stratification that complies with the legislated requirements for excluding pre-existing forest is possible. The technical procedures in these guidelines build on these learnings. As implementation of these procedures at the time of writing were preliminary, project proponents and agents are encouraged to continue to inform the Clean Energy Regulator of any potential improvements that are identified during implementation of these Guidelines.

All versions of the methods, in slightly different ways, require records to be made and kept to be able to demonstrate that CEAs only contain eligible land, including the exclusion of forest extent data.

Excluding land without forest potential

The HIR and NFMR methods both credit on the basis of an area, which has no forest cover, regenerating back to forest cover through undertaking an approved activity or activities.

In NFMR projects, to be eligible as a CEA, land must have had forest potential at the time of the decision to implement the project mechanism[16] and must continue to demonstrate regeneration at the 0.2 hectare scale[17]. For HIR projects, a CEA must also comprise land with forest potential, but this potential can emerge after project registration and such land may still be eligible for incorporation in new CEAs[18]. In each case, land must have potential to achieve forest cover at the time of CEA stratification to be considered eligible when applying for ACCUs.

For a CEA to have forest potential, at the time of its stratification, it must have sufficient trees (including seedlings and saplings) and these must have the potential to reach two metres or more in height with at least 20 per cent crown cover across the CEA[19]. The past presence of forest on the land prior to clearing is not in its self, sufficient to demonstrate the existence of forest potential.

Demonstrating continuing regeneration towards forest cover

As noted above, CEAs must demonstrate ongoing forest potential in order to remain eligible under both HIR and NFMR methods. Under NFMR, CEAs must demonstrate regeneration between reporting periods at the 0.2 hectare scale to remain eligible[20]. HIR and NFMR projects are expected, at approximately five yearly intervals or when requested by the Clean Energy Regulator, to provide an explanation of and evidence to support progress towards or attainment of forest cover in CEA that has not yet achieved forest cover[21].

Demonstrating attainment of forest cover

HIR and NFMR projects are expected to demonstrate achievement of genuine carbon abatement by excluding land that does not demonstrate progress towards forest cover[22]. The 2018 and 2019 CFI Rule amendments require a CEA to have achieved forest cover over 90 per cent of the CEA, when assessed in 0.2 hectare portions, for a certificate of entitlement to be issued after the forest cover assessment date[23].

[16] s2.4(5)(a) and s3.3(1)(a) of NFMR 2013, 2015 and 2018
[17] S3.6(5) of NFMR 2013, 2015, and 2018.
[18] s3.5(3) and s3.6 of HIR 2013 and 2015 | s15(3) of HIR 2016 and 2018
[19] Note that language varies depending on method/method variation.
[20] S3.6(5) of NFMR (all versions)
[21] S70(3A)(a) of the CFI Rule
[22] Sections 3.4 and 3.5 of HIR 2013 require that CEAs must be re-stratified as exclusion areas if regeneration is heterogeneous or absent, or fails to regenerate. Section 18(3) of HIR 2016 and 2018 requires that the CEAs must be re-stratified to remove CEA parts if they can no longer be reasonably expected to become native forest through regeneration or attain forest cover. NFMR projects are required to re-stratify CEAs as exclusion areas if land loses forest potential or fails to regenerate (s3.6(5)).
[23] A time, and in specified circumstances tonnes of carbon per hectare based milestone.

The 2018 and 2019 CFI Rule amendments

The 2018 and 2019 CFI Rule amendments clarify the intent of the HIR and NFMR methods—that areas with forest potential must achieve forest cover over time—and that this must be clearly demonstrated within a specified period of time.

The amendments apply to projects under the *Carbon Credits (Carbon Farming Initiative) (Human-Induced Regeneration of a Permanent Even-Aged Native Forest—1.1) Methodology Determination 2013* and its variants (HIR methods). They also apply to projects under the *Carbon Credits (Carbon Farming Initiative) (Native Forest from Managed Regrowth) Methodology Determination 2013*[24].

Key components of the amendments include requirements that:

- projects provide information demonstrating progress towards forest cover, implementation of the project mechanism and compliant CEA stratification at approximately five yearly intervals or when requested by the Clean Energy Regulator
  - » The guidelines that must be taken into account for said reporting are this document
- to obtain a certificate of entitlement for offsets reports submitted following a CEA's forest cover assessment date 90 per cent of the CEA (when assessed in 0.2ha portions) must have achieved forest cover.

These changes support robust implementation and ongoing integrity of the methods, and provide additional assurance that only eligible land is credited. They also provide a further incentive for proponents to ensure that they comply with their existing obligations to actively manage the project and accurately stratify CEAs to ensure forest cover is achieved on eligible land. The five-year regeneration checks provide greater certainty to project proponents on the circumstances that could risk large areas of a CEA being stratified out at the forest cover assessment date.

The 2018 and 2019 CFI Rule amendments were developed in parallel with these guidelines. They were designed to complement each other, and the existing legislation. Proponents should ensure that they are familiar with the amendments, in addition to the CFI Act, relevant method, and these guidelines, as required.

Agency approach

The position adopted by the Clean Energy Regulator as set out in Part B of these guidelines is designed to minimise the risk to proponents that they are over credited and to monitor forest potential of CEAs over time to ensure appropriate crediting.

The Clean Energy Regulator will expect evidence to be presented at approximately five-yearly intervals during the crediting period to show that the CEAs exhibit a positive change towards forest cover, and that any parts which do not are excluded. As explained in Part B, proponents are expected to provide reasonable assurance that pre-existing forest cover has been excluded from CEAs, and that land that is included has forest potential. CEAs are also expected to display appropriate forest cover by their forest cover assessment date in order to continue to be credited.

This approach is complementary to the requirements set out in the 2018 and 2019 CFI Rule amendments, which apply to all HIR and NFMR projects.

If proponents cannot demonstrate regeneration in accordance with the technical procedures outlined in Part B then:

[24] The NFMR method includes more onerous requirements to exclude areas that do not evidence regeneration at the 0.2 hectare scale. These guidelines provide flexibility and clarity on how the Clean Energy Regulator expects that proponents demonstrate compliance with these requirements.

- ACCUs will not be issued unless CEAs are re-stratified to exclude the areas where regeneration cannot be evidenced or a growth pause is applied, and
- the Clean Energy Regulator may seek the relinquishment of ACCUs depending on the circumstances[25].
  - » Where CEAs have previously been re-stratified to exclude areas that do not have forest potential and the proponent has subsequently reported, we will take into account the inbuilt mechanism in the methods that accounts for previously issued credits.

Proponents should refer to the Clean Energy Regulator's posture on the over and under crediting of certificates or units.

[25] Sections 88 and 89 of the *Carbon Credits (Carbon Farming Initiative) Act 2011*

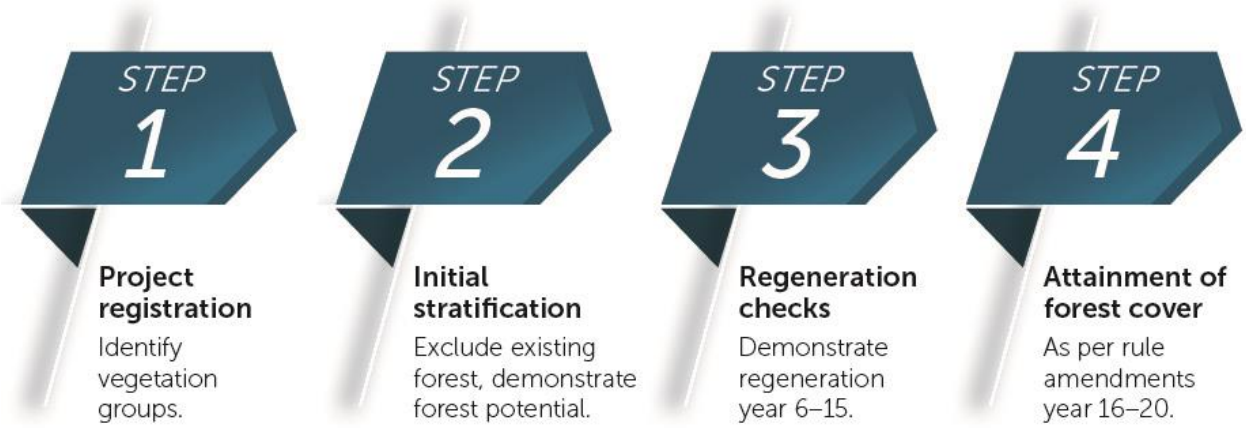
Overview of Part B: Process and procedures

These guidelines outline how projects under the HIR and NFMR methods can demonstrate that their CEA stratification satisfies the following key requirements:

- excluding pre-existing forest cover and gaining Clean Energy Regulator approval where applicable
- that the land in the CEAs has forest potential and is regenerating toward forest cover
- that areas that cannot demonstrate forest potential or regeneration are either reflected in pauses in the modelling or excluded through re-stratification, and
- demonstrating attainment of forest cover.

To provide assurance that these requirements have been met, proponents must collect and provide evidence in the manner outlined in Part B of these guidelines at the following project gateways, consistent with the 2018 and 2019 CFI Rule amendments:

Figure 1: Project gateways for application of guidelines



Through the consultation process, the Clean Energy Regulator and industry acknowledged that the methods require exclusion of pre-existing forest cover at the initial stratification gateway and that re-stratification for forest potential should occur progressively, based on the presence or absence of demonstrable regeneration. The 2019 CFI Rule amendment restricts the circumstances in which the procedures used to identify pre-existing forest cover can be altered for the purpose of identifying pre-existing forest or evidencing forest attainment. Monitoring forest potential and progress toward forest cover, and adjusting project activities, entering pauses in modelling where regeneration is disrupted, or re-stratifying is part of the active management required over the crediting period for the project.

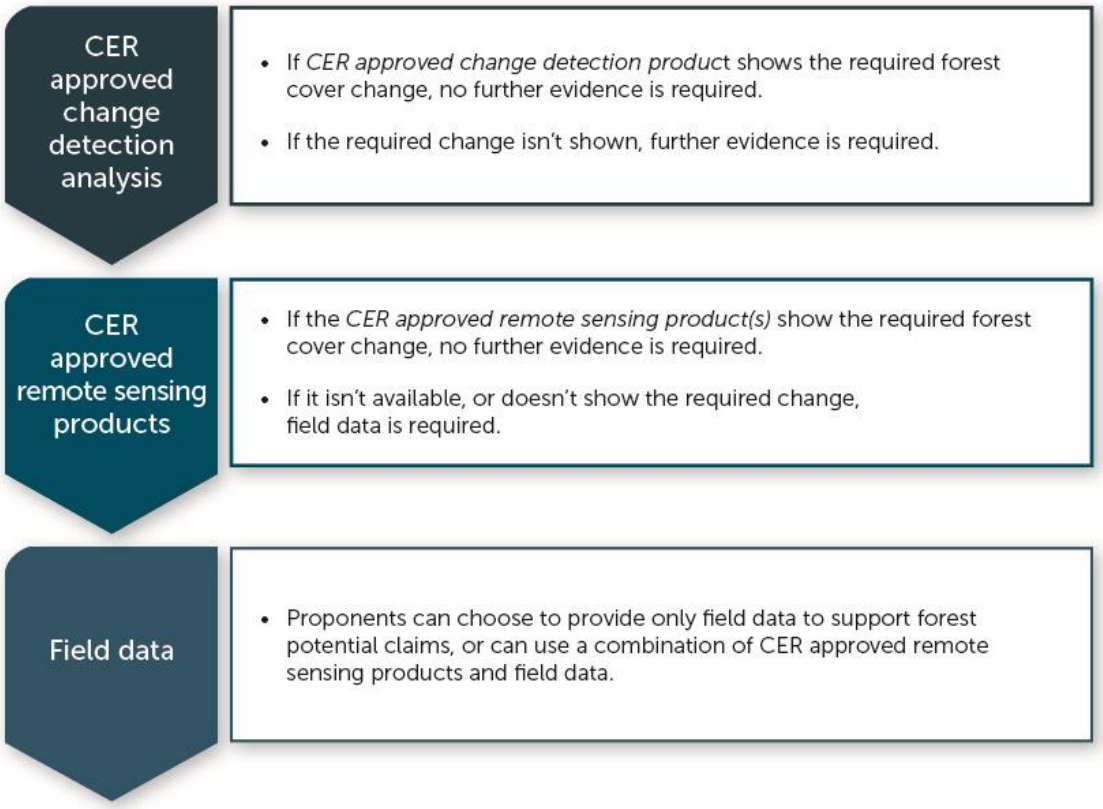
The ongoing regeneration requirements are reflected in regeneration checks, which must confirm that forest potential still exists and is regenerating successfully. If evidence that meets the requirements of the guidelines cannot be provided CEAs should be re-stratified to exclude relevant areas, or a growth pause should be applied if appropriate.

The Clean Energy Regulator and industry also agreed that allowing the use of accessible change detection products or remote sensing analysis evidence approved by the Clean Energy Regulator, with flexibility to use other evidence types such as field data or drone imagery to replace or supplement data, would allow industry to find the most cost effective ways to provide the required assurance and to take up new technology as it becomes available. To support this, these guidelines allow for a hierarchy of evidence that proponents may choose between.

The Clean Energy Regulator will approve use of different change detection and remote sensing products or processes (products) for use for offsets reports, and list relevant products in these guidelines or on our website as appropriate. The maps that form the basis of the National Inventory Report are approved to evidence forest cover attainment if also used to identify and remove pre-existing forest[26]. We expect proponents to use approved products, and we will assess whether they have been used appropriately. Products may be used when approved by the Clean Energy Regulator, or if they are publicly listed as approved at the end of an offsets reports reporting period.

Project proponents are expected to always undertake field sampling when developing initial stratifications and conducting map accuracy assessments. Field sampling is not mandatory for assessing regeneration or attainment of forest, however it can be used to improve the detection of regeneration. When project proponents use field data as an input to map accuracy assessment and/or evidence of regeneration, the Clean Energy Regulator expects that proponents will develop specific survey techniques that meet the minimum requirements set out in **Attachment C**: Field validation for training and map accuracy assessment and regeneration surveys.

Figure 2: The Evidence Hierarchy



Where none of the evidence types above can support forest potential claims, the area must be excluded, or a growth pause applied as appropriate.

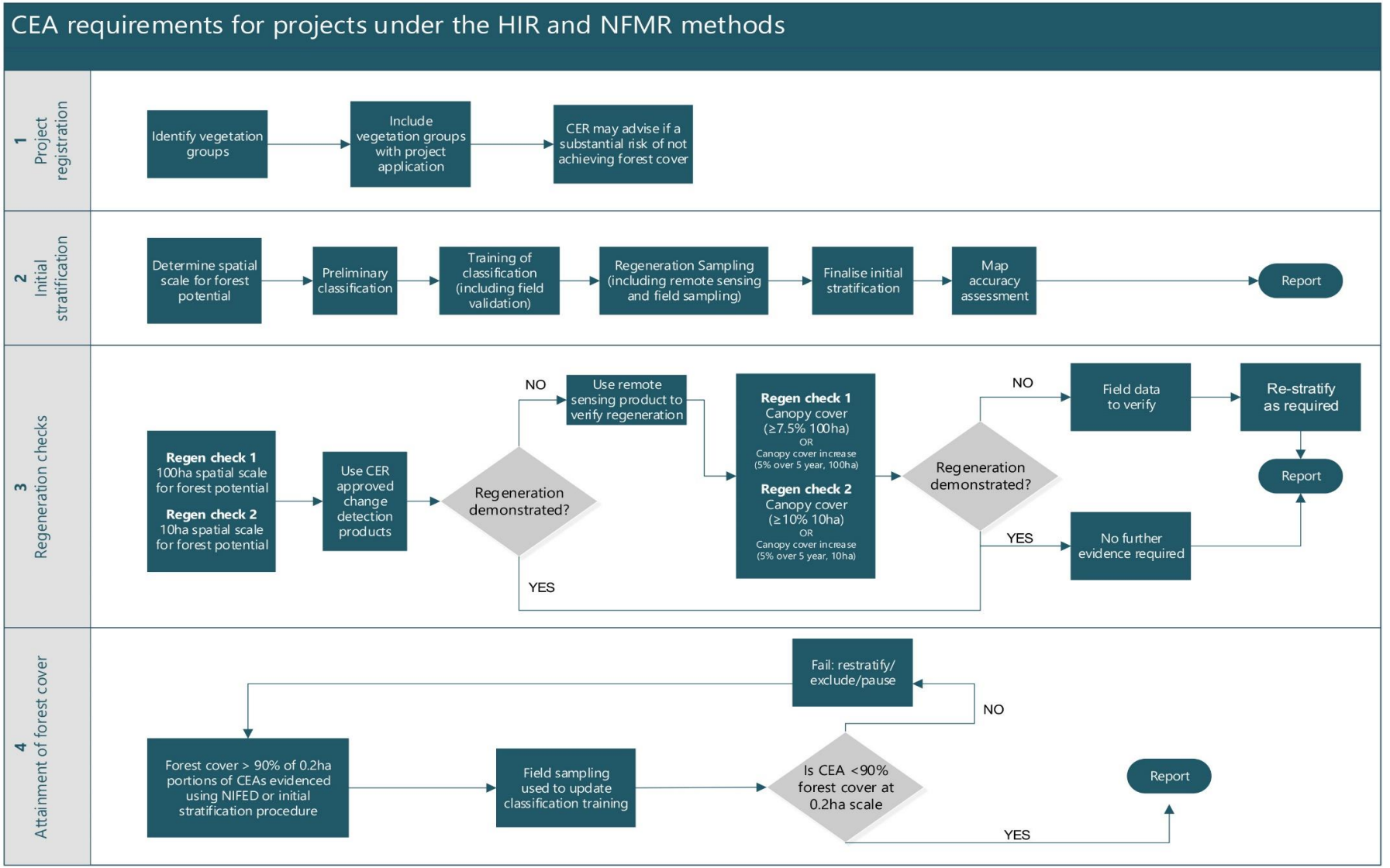
Initial stratification and the attainment of forest cover phases are key gateways that require rigorous assessment and evidence. Projects that have already reported will be required at their next report to define a map of baseline forest cover and specify the processes used to create the map. In addition a project may be required to report against whatever gateway regeneration check they have most recently passed.

[26] In accordance with s9AA(4)(a) of the CFI Rule.

Proponents are expected to map all forest cover at the 0.2ha scale. This scale of mapping for forest cover reflects the greater ability to detect mature forest. The increasingly narrow spatial scales that are to be applied to detect forest potential is intended to align with the increased ability to detect regeneration over time plus the initial patchy nature of regeneration in these areas which is expected to become more consistently spread over time. The procedures allow proponents to plan assessment, monitoring and reporting activities with confidence.

Figure 3. CEA Requirements

This diagram provides a summary of the technical processes and procedures, which are detailed in Part B of these guidelines.



Application and administration of these guidelines

Compliance approach

Consistent with the Clean Energy Regulator's stated 2018 compliance priorities, the Clean Energy Regulator will continue to use a risk-based sampling approach to test CEA conformance with these guidelines. We will expect proponents to progressively assess and re-stratify CEAs to address forest potential and regeneration towards forest cover (forest regeneration) in the manner outlined in outlined in Parts A and B of these guidelines.

If the Clean Energy Regulator identifies substantial discrepancies in CEA stratification, we will use our discretion in deciding to ask for additional evidence that supports CEA stratification.

Uncertainty

The Clean Energy Regulator expects all claims for ACCUs to comply with applicable legal requirements, and that any concerns raised are appropriately addressed. This will include the removal of areas with pre-existing forest cover and without demonstrated forest potential from CEAs.

Where future claims include a CEA that materially exceeds acceptable levels of variance, the Clean Energy Regulator may review past claims for ACCUs for the project. Proponents will be asked to justify the inclusion of all ineligible land within a CEA before a final decision is made to credit ACCUs for applications under assessment.

False and misleading information

The Clean Energy Regulator expects high levels of compliance from all participants across all the schemes it administers. Where false or misleading information has been provided, the Clean Energy Regulator may take enforcement action, which can include imposing requirements to relinquish ACCUs, project revocation, and/or initiating court proceedings.

Carbon abatement contracts

The Clean Energy Regulator recognises that many projects under the HIR and NFMR methods provide abatement to the Australian Government through carbon abatement contracts. If after implementing the requirements of these guidelines, proponents believe that they may no longer be able to meet their current contracted obligations, they are encouraged to contact the Clean Energy Regulator to discuss concerns. Each case will be handled on a case-by-case basis, in line with contract management processes and under commercial-in-confidence arrangements.

Administrative arrangements

The Clean Energy Regulator expects that all projects will adhere with the requirements of these guidelines, effective from the first offsets report submitted after their publication on 8 May 2019. Projects are expected to meet all gateways.

Projects that have already reported are expected to do appropriate due diligence to review the project's initial stratification against requirements outlined in these guidelines. After the due diligence review, proponents can update procedures that underpin the CEA boundaries. With the first offsets report submitted after the publication of these guidelines, or in alignment with agreed transition timeframes, proponents will be required to provide a map of excluded pre-existing forest cover that was either excluded at the first offset report, or as revised after conducting their review. Project proponents must also provide

sufficient data, and information on the procedures followed, to enable the stratification to be repeated at a later date. Project proponents will be required to use a consistent data sources and processes to assess forest cover when both identifying pre-existing forest and to evidence forest cover attainment.

If a project proponent is unable to conform to these guidelines at their next offsets report, project proponents or their agents will need to seek Clean Energy Regulator approval to transition their offsets report to these guidelines over a longer period (not more than 18 months from the date of publication of these guidelines) negotiated with the Clean Energy Regulator. The additional time agreed will enable collection and analysis of required data to evidence compliance with these guidelines. Project proponents or agents will need to provide a transition plan outlining the reasons that transition cannot occur sooner and outline a plan of actions to transition projects as soon as practicable. During any agreed transitional period, project proponents may submit offset reports that are not fully compliant with all parts of these guidelines, as negotiated with the Clean Energy Regulator.

Where proponents have been acting in good faith and re-stratify CEAs in accordance with the processes and procedures specified in Part B and use approved data sources and processing approaches, relinquishment of ACCUs in subsequent offset reports is not anticipated for the following reasons:

- the carbon stock accumulation models in FullCAM and RMT provide for relatively smaller amounts of crediting in the early periods of the project
- carbon stock accumulation will accelerate as the regrowth matures thereby allowing remaining CEA areas to generate enough abatement to compensate for the potential reduction in the size of CEAs, and
- where areas are removed from CEAs, the methods' formulae will adjust in the following offset report.

Evidence of forest cover over the life of a project

The Clean Energy Regulator will require project proponents to apply consistent procedures (including consistent data sources and processing) to support both exclusion of pre-existing forest cover and attainment of forest cover as required by the 2019 CFI Rule amendment. Use of a consistent methodology provides a fair metric to ensure that only detected change in forest cover is credited under the methods. If divergent procedures were allowed to be used for these matters, this would risk ACCUs being issued where abatement had not occurred. Proponents are able to adopt more accurate methodologies to identify pre-existing forest in their CEAs over time. Any methodology must conform to the procedures and reporting requirements outlined in Part A and B of these Guidelines and be approved by the Clean Energy Regulator. Irrespective of the methodology developed to identify pre-existing forest at the initial stratification, or as improved during the project, project proponents remain able to use the maps that form the basis of the National Inventory Report to evidence forest cover attainment if these maps do not identify any pre-existing forest cover within the CEAs[27].

Ensuring a consistent approach is particularly important for projects where the initial stratification has already occurred and due to the passage of time, evidence to support the exclusion of pre-existing forest cover in alignment with these guidelines outlined in Part B, is hard to obtain. The Clean Energy Regulator will take a pragmatic view in situations where evidence does not exist due to the passage of time that is required to meet the processes outlined in these guidelines so please contact the Clean Energy Regulator for guidance.

If a project has reported before the publication of these guidelines on 8 May 2019 and is unable to fully comply with the initial stratification requirements outlined in Part B to support exclusion of pre-existing forest, project proponents or their agents will need to propose to the Clean Energy Regulator alternative

[27] s9AA(4)(a) of the CFI Rule.

arrangements for consideration. Any alternative arrangements would need to ensure a consistent procedure (including consistent data sources and processing) is to be applied to support both exclusion of pre-existing forest cover and forest cover attainment.

Reporting on multiple project gateways

Proponents may report on requirements for different project gateways at the same time. For example:

- Projects whose first offsets report cover years one to five of their crediting period need to report against both their initial stratification and a regeneration gateway in the same report
- Projects which have CEAs with significantly different forest cover assessment dates may need to report against regeneration gateways for some CEAs and the forest cover attainment gateway for other CEAs in the same offsets report, and
- Projects that have reported already prior to these guidelines being published will need to:
  - » provide information relevant to the initial stratification gateway, and
  - » report against whatever other gateway they have most recently passed (if any)
  - » when they first report after the publication of these guidelines.

New projects with early modelling commencement dates

New projects (those registered after the publication of these guidelines on 8 May 2019 with modelling commencement dates that are three to five or more years prior to the likely first offset report may have difficulty in collecting all the initial stratification evidence at the time of reporting. For example, areas below the threshold of forest may grow to become forest during these early years before field validation is completed. As such, it may be in the interest of proponents to undertake the initial stratification gateway process described in these guidelines either before or shortly after project registration.

Early achievement of reporting requirements

Evidence that regeneration requirements have been attained at an earlier time than the timeframes specified in these guidelines or the legislation can be accepted and assessed by the Clean Energy Regulator at the earlier time.

Part B: Process and procedures

The process and procedures—the tools and techniques—in these guidelines describe the Clean Energy Regulator's expectations to stratify project areas, particularly CEAs, and the evidence that must be reported. The Clean Energy Regulator will accept evidence to support CEA identification and stratification that, as a minimum, meets the specifications in these guidelines. This allows proponents to use other more robust processes and to innovate over time.

This document has been written for a technical audience that have a combination of knowledge in both Geographic Information System (GIS) and biological sciences. If you do not understand technical terminology or procedures, you may wish to seek expert advice.

Accurate documentation by project proponents or agents will assist them to reduce their risk of over-estimating likely future carbon abatement. These technical procedures are designed to reduce this risk over time. The evidence and reporting requirements provide greater confidence to the industry, the Clean Energy Regulator and the community that carbon abatement is additional and genuine.

These guidelines cover process, methodology and reporting requirements for the following four project gateways:

1. Project registration
2. Initial stratification (normally at the time of initial audit)
3. Regeneration checks
4. Attainment of forest cover

Where data is unavailable (e.g. earlier remote sensing products) or cannot be practically obtained (e.g. field samples from the past) to meet the methodology described below, this should be raised for resolution by the proponent with the Clean Energy Regulator. Projects registered prior to the publication of these guidelines may consider discussing alternative administrative arrangements with the Clean Energy Regulator.

The Clean Energy Regulator will also accept and assess reports that have met the evidentiary requirements for a later phase at an earlier time, provided this is consistent with the legislative requirements.

Determining spatial scales for assessing regeneration

For ease of reference, the spatial scale for assessing forest potential and subsequent regeneration (collectively forest regeneration) is provided here and should be applied at the appropriate time when preparing an offsets report. The appropriate time is when preparing an offsets report for a reporting period that ends in a year specified below. Note that spatial scales provided only specify maximum sizes. Smaller spatial scales may be used as needed for various remote sensing products.

- Year 1: 1000ha, or total area of CEA if less than 1000ha
  - 14 years prior to a CEA's projected forest cover assessment date
- Year 2: 750ha, or total area of CEA if less than 750ha
  - 13 years prior to a CEA's projected forest cover assessment date
- Year 3: 500ha, or total area of CEA if less than 500ha
  - 12 years prior to a CEA's projected forest cover assessment date
- Year 4: 300ha, or total area of CEA if less than 300ha
  - 11 years prior to a CEA's projected forest cover assessment date
- Year 5: 200ha, or total area of CEA if less than 200ha
  - 10 years prior to a CEA's projected forest cover assessment date
- Year 6: 100ha, or total area of CEA if less than 100ha
  - 9 years prior to a CEA's projected forest cover assessment date
- Year 10: 10ha, or total area of CEA if less than 10ha
  - 5 years prior to a CEA's projected forest cover assessment date
  - The forest cover attainment date[28]: 0.2ha

The relevant year is defined in relation to the CEA's projected forest cover assessment date, as described above. The projected forest cover assessment date must be reckoned by disregarding only any actual eligible growth disruption period and by assuming that the requirement in section 9AA(6)(a) of the CFI Rule has been satisfied.

When assessing forest regeneration using remote sensing products, individual strata parts (polygons) must be contiguous areas, or groups of contiguous areas, that align with the CFI mapping guidelines and comply with the following maximum spatial scales in the relevant year as outlined above. Groups of contiguous areas must have uniform features and only be separated by an exclusion area of ineligible land.

Groups of contiguous areas as outlined above, can also be used when assigning field validation survey plots to validate the classification.

Growth pauses

Consistent with the relevant version of the method and modelling guidelines, proponents may apply modelling growth pauses in accordance with the method when carbon stocks do not increase. The reporting timeframes for the initial stratification described below do not change due to a modelling pause event. Regeneration will be assessed at a scale that appropriately reflects time until the forest cover assessment date, consistent with the 2018 and 2019 CFI Rule amendments. Similarly, required threshold percentages of

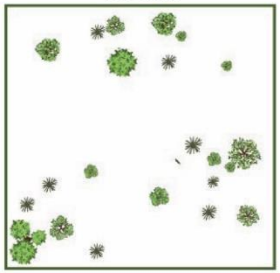
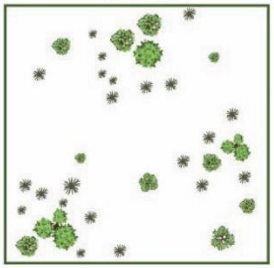
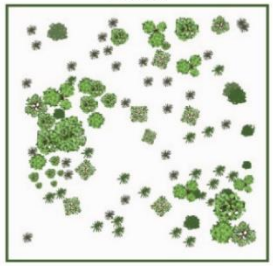
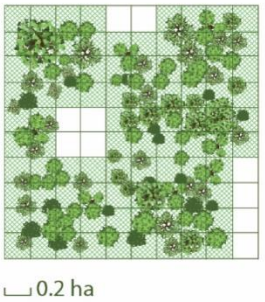
[28] Forest cover assessment date has the same meaning as that given by section 9AA(6) of the CFI Rule.

canopy cover are tied to relative distance from a CEA's projected forest cover assessment date, and the period of time in which regeneration has occurred. Only the full canopy of trees or shrubs that are two metres or more will contribute to canopy cover thresholds.

The attainment of forest cover gateways is affected by growth pauses, consistent with subsection 9AA(6) of the CFI Rule.

Figure 4: Evidence requirements for assessment outlines how the guidelines require assessment—starting from a broad area, to a smaller area to reflect the process of infilling of vegetation and the difficulty in detecting small trees using medium resolution remote sensing data. As a project progresses a finer scale is applied. In the first instance, we will use remote sensing products to evidence forest potential in the project area. Field validation is used to support or replace remote sensing as appropriate. Only the full canopy of trees or shrubs that are two metres or more will contribute to canopy cover thresholds. The same procedures used to identify pre-existing forest are expected to be applied to evidence attainment of forest cover. These may be updated over time, but only if they are applied to both pre-existing forest cover and attainment of forest cover.

Figure 4: Evidence requirements for assessment

Evidence hierarchy	Initial stratification	Regeneration check (year 6)	Regeneration check (year 10)	Attainment of forest cover
Example CEA	500ha 	100ha 	10ha 	Whole CEA 
CER approved change detection analysis	N/A	• Average increase in woody vegetation at 100ha scale	• Average increase in woody vegetation over the previous 5 years at 10ha scale	N/A
CER approved remote sensing products	• Removal of existing forest at 0.2h scale, and • ≥5% canopy cover of vegetation ≥2m height, at 1000-200ha scale depending on the year of the initial offset report	• ≥7.5% canopy cover of vegetation ≥2m height, at 100ha scale, or • ≥5% increase to canopy cover of vegetation ≥2m height, over 5 years at 100ha scale	• ≥10% canopy cover of vegetation ≥2m height, at 10ha scale; or • ≥5% increase to canopy cover of vegetation ≥2m height, over 5 years at 10ha scale	• National Inventory Forest Extent Data, 90% of 0.2ha portions have achieved forest cover • Initial stratification data updated and processing repeated
Field data	• Average density of individual trees, sampled from within 1000-200ha areas, must exceed levels prescribed in CER guidelines ** Field validation is required for classicisation and map accuracy assessments*	• Average density of individual trees, sampled from within 100ha areas, must exceed levels prescribed in CER guidelines	• Average density of individual trees, sampled from within 10ha areas, must exceed levels prescribed in CER guidelines	• Update classification (classification training)

Detailed explanation of project gateways

1. Project registration

Purpose

To assess the land suitability to meet the method's requirements to achieve forest cover for part of the project area.

When

On application for project registration (declaration).

What

In addition to other legislative requirements, proponents are to identify one or more native vegetation groups within the project area that are likely to regenerate to achieve forest cover.

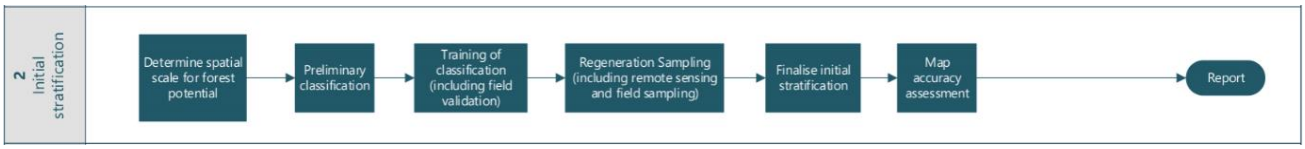
How

Vegetation groups may be determined taking into account national or state vegetation mapping, soil type and moisture content, topography and recent regeneration (for example, tree seedlings, rootstock re-growth), sapling or tree presence or absence within the project area. Regional vegetation maps (for example, NVIS – Department of Environment and Energy data) may be a useful tool.

Agency review

On notification of registration of the project, the Clean Energy Regulator may notify project proponents or agents if there are substantial areas within the project area that are considered a high risk of not being able to achieve forest cover within the legislated timeframes, taking into consideration the proponent's identified vegetation group/s. The Clean Energy Regulator's ability to identify areas at risk of not being able to achieve forest cover can be expected to improve over time with improved vegetation mapping, remote sensing and knowledge gained through monitoring the portfolio of Emissions Reduction Fund projects over time.

2. Initial stratification



Purpose

To ensure the boundaries for each CEA are mapped as accurately as possible during the initial stratification, particularly for pre-existing forest cover, while being aware of the challenge of detecting and monitor forest potential in the early years.

When

Before submitting the first offsets report due for submission after publication of these guidelines for:

- projects registered after 8 May 2019 (new projects)
- projects that have not reported before 8 May 2019, or
- land added to an existing project after 15 August 2018.

Projects that have already reported can use the administrative arrangements outlined earlier. They are expected to do appropriate due diligence to review the project's initial stratification against the requirements outlined in these guidelines. After this review, proponents can update procedures that underpin the CEA boundaries. With the first offsets report submitted after the publication of these guidelines, or in alignment with agreed transition timeframes, proponents will be required to provide a map of excluded pre-existing forest cover that was either excluded at the first offset report, or as revised after conducting their review. Project proponents must also provide sufficient data, and information on the procedures followed, to enable the stratification to be repeated at a later date. Project proponents will be required to use a consistent data source and processes to assess forest cover when both identifying pre-existing forest and to evidence forest cover attainment.

The Clean Energy Regulator will take a pragmatic view in situations where evidence does not exist due to the passage of time, or time is required to collect further evidence, is required to meet the processes outlined in these guidelines. If previously submitted offsets reports did not address the reporting requirements described below, proponents are expected to take actions over the administrative timeframes to comply with the requirements in these guidelines, and unless otherwise discussed with the Clean Energy Regulator, provide the required information in the first offsets report submitted after these guidelines were published, on 8 May 2019.

It is important that proponents are aware that both HIR and NFMR methods include mechanisms that effectively recover any previous ACCUs issued for ineligible land. Timely compliance with these guidelines will reduce the risk of a more substantial change to ACCUs issued in a future reporting period.

What

Initial stratification must demonstrate, using the appropriate spatial scale that CEAs are on eligible land that does not contain pre-existing forest cover and only contains land with forest potential. This includes:

- identification and exclusion of areas that had pre-existing forest cover, in accordance with the requirements in the relevant version of the method, at a scale of 0.2 or more hectares (ha), and

- identification for inclusion in each CEA, areas that have forest potential based on an assessment of remote sensing and field sampling at the year-based scale defined in figure 4 of this guideline.

How

These guidelines outline the process and methodology steps to develop the initial stratification, as detailed below, are:

1. Preliminary classification of remote sensing data
2. Training of remote sensing data classification (including field validation)
3. Regeneration detection using remote sensing data (including sampling)
4. Finalise initial stratification
5. Map accuracy assessment, and
6. Report

Projects that have already reported can seek Clean Energy Regulator endorsement of alternative procedures.

For mapping of pre-existing forest cover the scale to be used is 0.2 ha. Pre-existing forest cover and forest cover achievement are to be mapped at the same scale and in the same methodology (same data sets and processing). Use of this scale and consistent methodology provides a fair metric to ensure that forest cover is assessed consistently at the beginning and end of projects. Proponents are able to adopt more accurate methodologies to identify pre-existing forest in their CEAs over time. Any updated methodology must conform to the procedures and reporting requirements outlined in Part A and B of these Guidelines and be approved by the Clean Energy Regulator. A key requirement to gain approval will be that the new procedure must improve accuracy of forest detection and the CEA must not include any pre-existing forest identified using the new approach.

Proponents are expected to provide a map of pre-existing forest cover with the first offsets report submitted after these guidelines were published. If a map of pre-existing forest cover is not provided with the first offsets report submitted after the publication of these guidelines, the Clean Energy Regulator will require submission of updated classification of initial stratification, using the best available imagery including all inputs and outputs, data, maps and algorithms used to develop proposed CEAs at each subsequent offset report. This is required to evidence that adequate procedures were followed to identify and exclude pre-existing forest cover. The guidelines also allow some flexibility on whether Step 3—Regeneration using remote sensing data, is used with some field sampling, or replaced by more intensive field sampling. The former is likely to be cost effective for larger projects, but requires remote sensing expertise.

The specific ordering of individual fieldwork tasks and remote sensing analysis could vary, while the map accuracy assessment would remain the final step before reporting. There is also an expectation that field sampling methods can be designed to meet multiple purposes (for example, data on regeneration could also be used to train classification algorithms).

1. Preliminary classification of remote sensing data

- Preliminary classification mapping is to be undertaken by proponents using a Clean Energy Regulator approved remote sensing product. We will publish a list of approved products on our website and proponents can seek approval and listing of other products.

Options for preliminary classification of remote sensing data may include use of an unsupervised classification, supervised classification, manual digitisation classification by an independent expert or a combination of these approaches.

- The remote sensing product is used to classify the project areas at the specified mapping scale into contiguous areas of 0.2ha or greater. This will include classifying areas of the project into:
- forest potential (CEA); that is land with saplings or trees and evidence of regeneration of these,
- pre-existing forest cover (as per the method and meeting conditions of at least 20 per cent crown cover of the land and greater than two metres in height) at the 0.2 ha scale, and
- other exclusion areas or project areas
- areas that lack current evidence as, but which may be able to demonstrate forest potential in the future, and
- other areas without forest potential.

Areas that currently do not demonstrate forest potential at initial stratification, but may be able to in future, should not be identified as having forest potential. They may be mapped as having future forest potential only if the relevant version of the method allows additional CEAs to be added at a later date and the land meets other method requirements. Subject to this, an area with future forest potential might include areas with insufficient numbers of individual trees (for example, impacted by compaction, insufficient seed bank or no significant rain event) or an area that currently has an alternative land use.

- Other areas without forest potential include areas that fail to satisfy method requirements, such as water features, rocks, saltpans, infrastructure or an alternative land use that is unlikely to support regeneration to forest.

The CFI Mapping Guidelines describe how Emissions Reduction Fund land sector projects are required to undertake mapping of their projects. These guidelines describe overall requirements of the Clean Energy Regulator across the five phases discussed, including mapping requirements. The Department of the Environment and Energy will look to update the CFI Mapping Guidelines to adopt the relevant mapping requirements of these guidelines following consultation. **Attachment B** outlines potential mapping requirements for inclusion in the CFI Mapping Guidelines, however, other parts of these guidelines may be included in the CFI Mapping Guidelines over time.

Note: When assessing forest regeneration, individual strata parts (polygons) must be contiguous areas, or groups of contiguous areas, that align with the CFI mapping guidelines and comply with the maximum spatial scales in the relevant year as outlined earlier. Groups of contiguous areas must have unified features and only be separated by an exclusion area of ineligible land.

2. Training of remote sensing data classification (including field validation)

- To support the robust identification of forest potential and areas of pre-existing forest cover using remote sensing products, survey points must be identified and field sampled. A training sample of set points must be used, as must an independent sample of locations be set for assessing the map accuracy. This requirement applies regardless of the mapping process used.

- Information sources to train the classification must use robust levels of field validation data from within the project area in alignment with the field validation plot and regeneration sampling procedures. A range of other information sources, including high-resolution imagery, other remote sensing products and/or additional field data from within or outside the project area, can be used to train the initial classification.
- Map accuracy assessment data is also to be collected through field validation data from within the project area.

Field validation plots

- Validation plots must be used to characterise areas defined in preliminary classification, and follow the procedure outlined in **Attachment C**. The focus of validation will be on identifying features of forest and verifying that areas without visible woody vegetation in remote sensing products, have adequate tree or sapling densities on the ground. The procedures for remote sensing analysis and field validation sampling are detailed below.
- After preliminary classification, allocate a robust sample of validation plots using a stratified random approach to each feature class. This data is collected to both be used to improve the image classification and evidence that it is adequate. While all strata must be field sampled, the intensity of sampling can be varied in individual strata to improve overall map accuracy. Equally, while a random sample is always required, it can be minimised if augmented with additional targeted sampling that is targeted toward specific features or classes.

Note: Field survey intensity is directly related to data source quality, number of feature classes and the quality of the stratification approach. More sophisticated algorithms calibrated using area-specific information should require a lower field survey intensity.

- Randomly allocated field validation plot data must be split to provide data to train the classification and to perform the map accuracy assessment. 70 per cent of the randomly allocated plot data is selected to train the image classification model. Samples can be allocated through a random, seeded pseudo-random, or systematic procedure that ensures there is representative data. Additional targeted samples can be used if required to validate image classification above the map accuracy assessment threshold. If a robust sample of targeted samples is applied, the level or random sampling can be reduced, but not eliminated.

While a robust sample is required for both training and map accuracy assessment, the per cent ratio of 70 per cent to train classification and 30 per cent for map accuracy assessment could be adjusted based on individual project requirements to meet map accuracy requirement or other needs. If the ratio is to be substantially different, we recommend seeking confirmation from the Clean Energy Regulator on the approach.

In addition to sites allocated for training or map accuracy assessment, additional field information can be collected for each purpose.

3. Regeneration detection using remote sensing data (including sampling)

- Validation plot sites used for training and map accuracy assessments can also be used to provide regeneration evidence.

Note: It is likely that projects will require additional individual plots to those used for map accuracy training for regeneration sampling.

- Remote sensing products such as the Foliage projected coverage (FPC) data used for the State-wide Landcover and Tree Study (SLATS), SPOT or land classified as woody vegetation in the National Inventory forest extent date from the relevant year may be used to identify areas of woody vegetation above five per cent canopy cover at two metres in height over the relevant spatial areas for the respective year outlined in Step 1—Determine the scale required for mapping of forest potential.

Sampling

- Contiguous areas that cannot evidence five per cent canopy cover at two metres in height with remote sensing would be required to conduct field sampling to justify forest potential and their inclusion in CEAs. Strata must comply with spatial scale requirements for individual years as outlined previously.
- Projects must allocate a statistically robust sample of field plots to each stratum. Sites will be allocated using random, pseudo random or systematic approaches that minimise potential bias. The level of randomly allocated field plots can be reduced, but not eliminated, if a robust targeted sample is also applied. Methods of field sampling of regeneration will be consistent across the project and aligned with requirements in **Attachment C**. The main objective of the regeneration field sampling is to evidence average tree or sapling densities in each stratum exceed levels prescribed in **Attachment A**. The trees or saplings of relevance will be species found in field sampling in the project area that have exceeded two metres in height.

4. Finalise initial stratification

- Where remote sensing analysis and field validation does not determine adequate (≥ 5% but < 20%) per cent canopy cover or density of individual trees above the levels prescribed in **Attachment A**, the relevant stratum or strata is to be removed from the CEA.

5. Map accuracy assessment

- A map accuracy assessment must then be conducted on the mapping of the remaining CEAs. The assessment should include the assigned field sample plots, which can be used in conjunction with remote sensing samples. The Clean Energy Regulator will accept mapping accuracies at or above 85 per cent for pre-existing forest and forest potential classification types.

  Note: The 85 per cent accuracy level will be re-assessed over time to ensure it remains achievable, there is not a bias toward including pre-existing forest in CEAs across the portfolio, and the level aligns with improvements to technology and learning over time. Any revised accuracy level would only be applied to future CEA determinations.

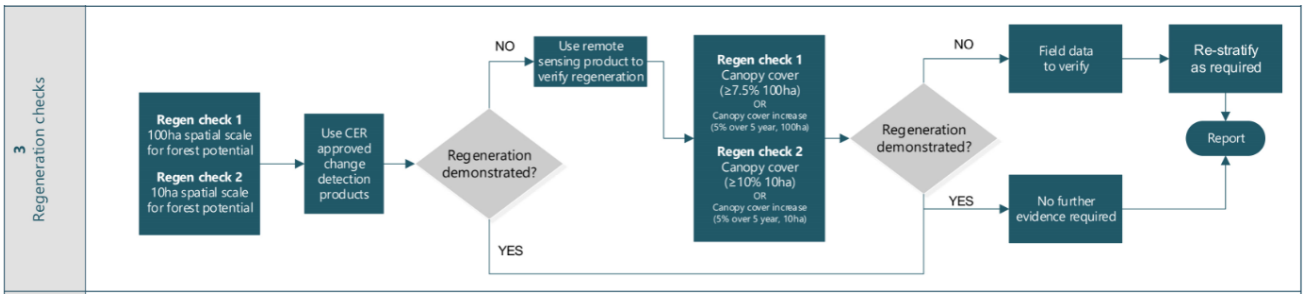
  Note: Under some versions of the methods, proponents can introduce CEAs that did not display required tree densities or percentages of crown cover at initial stratification if they meet said requirements at later reporting periods. We expect the information discussed above to be provided for such CEAs in the offsets report in which they are first stratified.

6. Report

The following information on the preliminary stratification must be provided in the initial offset report to the Clean Energy Regulator (or subsequently as indicated above for existing projects):

- GIS shape and point files that comply with CFI Mapping Guidelines and these guidelines outlining the proposed initial stratification, including CEAs, pre-existing forest and other exclusion areas, and an image version of the map.
- Detailed description of the procedures followed to comply with these guidelines/the Mapping Guidelines/2018 and 2019 CFI rule amendment. This would include:
  - » justification of the selection of the field sampling sites in regard to robustness or statistical robustness of sample sizes and features to avoid sampling bias.
  - » detailed descriptions of plot dimensions and methodology for training sites, map accuracy assessment sites and field sites.
  - » table outlining results of map accuracy assessment.
  - » tables outlining the sample sizes, mean, bias, standard error and any measures of statistical robustness of sample sizes.
  - » GIS shape and point files of all field sample sites and remote sensing imagery analysis sites, including those used to identify pre-existing forest cover. The map should also include boundaries of areas evidenced using change detection products, remote sensing analysis or field sampling to verify tree densities or percentage canopy cover. An image version of the map should be included in the offset report.
  - » list of species identified in fieldwork in the project area that exceeded two metres. If additional species are identified that may reach two metres, then clear justification as to why the species could be expected on average to reach two metres in the project area.

3. Regeneration checks



Purpose

To enable proponents to assess and demonstrate forest regeneration within existing CEAs. This provides increased certainty that only eligible land is credited, and that each CEA is progressing towards forest cover.

When

Proponents must provide regeneration checks at least once every five years from the start of the project's last or only crediting period until CEAs pass their forest cover assessment date[29], and upon request by the Clean Energy Regulator.

Where an audit report must be provided with an offset report, forest regeneration information must also be provided.

What

CEAs are to be assessed and evidence must be demonstrated to show an increase in forest cover at the mapping scale appropriate to the relevant year. Remote sensing approaches must use the latest imagery sourced for the relevant year the report is submitted in or within the period being reported on.

For CEAs covered in an offsets report submitted from year six until year 10, in the relevant CEA, forest cover must have reached:

- 7.5 per cent or more in canopy cover of vegetation over two metres in height at the 100 hectare scale, or
- Five per cent increase in canopy cover of vegetation over two metres in height over five years, or
- sufficient trees and saplings on ground.

For CEAs covered in an offsets report submitted from year 10, in the relevant CEA, forest cover must have reached:

- 10 per cent or more canopy cover of vegetation over two metres in height at 10 hectare scale, or
- Five per cent or more increase to canopy cover of vegetation over two metres in height over five years at the 10 hectare scale.

[29] Forest cover assessment date has the same meaning as that given by section 9AA(6) of the CFI Rule.

Proponents should also undertake field validation of adequate average numbers of individual trees in an area of the applicable spatial scale, above the levels prescribed by minimum average tree or sapling densities in **Attachment A**.

The requirements for years six and 10 must be covered in an offsets report that includes a regeneration check for a reporting period that covers any part of that year, or in the next following offsets report that includes a regeneration check if those requirements have not been covered in a previous offsets report.

Re-stratification of CEAs is required where sufficient canopy cover, regeneration or tree densities cannot be demonstrated, unless an appropriate pause is entered in the model to reflect a disruption event.

> *Note: Proponents may re-stratify existing CEAs or new CEAs at any time during a projects crediting period, where the method allows. Re-stratification of existing CEAs and new CEAs should be reported on in the next offset report submitted after the re-stratification occurs.*

How

The process and methodology includes one or more of the three evidence requirements and reporting:

1. Evidence level 1: Change detection analysis, or
2. Evidence level 2: Remote sensing analysis and/or
3. Evidence level 3: Field data; and
4. Reporting

The regeneration checks preference the use of accessible change detection analysis or other remote sensing analysis, but allow flexibility to use other evidence types as outlined.

1. Evidence level 1: Change detection analysis

- Change detection products (maps), as approved by the Clean Energy Regulator, can be used to demonstrate the accumulation of perennial plants that have primary supporting structures consisting of secondary xylem (referred to as persistent woody vegetation) in an individual strata over the relevant period, or
- An average material increase in persistent woody vegetation at the appropriate scale of contiguous areas is sufficient evidence of forest potential.

2. Evidence level 2: Remote sensing analysis

- If an approved change detection product does not identify change in a defined contiguous area, then remote sensing products can be analysed to provide evidence of regeneration.
- A desktop analysis of the two time sets of the same remote sensing products can be used to estimate the per cent change in canopy cover of vegetation over two metres in height, over contiguous areas of the appropriate spatial scale.
- For areas with an estimated five per cent or more increase in canopy cover of vegetation over two metres height over the five year period this analysis will provide sufficient evidence of forest potential for those areas, if the methodology has been used appropriately, and is approved by the Clean Energy Regulator.

3. Evidence level 3: Field data

All contiguous areas, or groups of areas, with polygons defined in alignment with CFI Mapping Guidelines, of the appropriate spatial scale, that failed to satisfy the criteria for forest potential outlined in either the change detection products or remote sensing product analysis must be further assessed using regeneration verification plots.

When there are multiple contiguous areas that have uniform key features, such as consistent age of regeneration, species and density, that are only separated by areas of ineligible land, they can be grouped into larger strata before assigning or field validation survey plots to validate the classification.

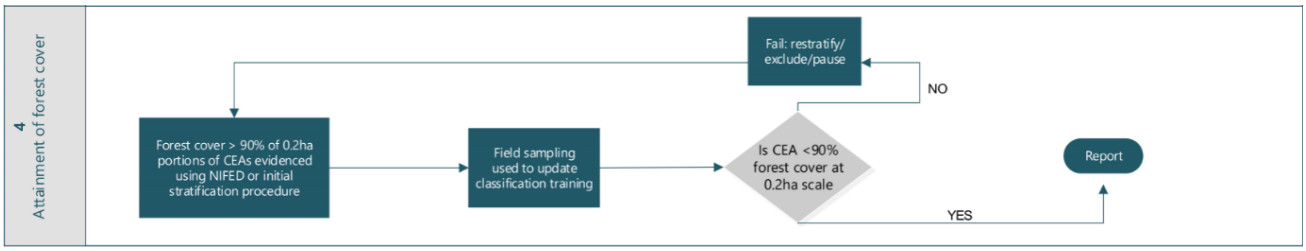
- A statistically robust sample of regeneration verification plots must be allocated to each contiguous area, of the appropriate spatial scale, or strata separated through robust feature classification. Samples in each contiguous area or stratum must be allocated using a random, seeded pseudo-random or systematic procedure, with adequate controls for possible bias. The Clean Energy Regulator will assess the appropriateness of the sampling approach used.
- Where regeneration verification plots do not determine adequate average numbers of individual trees in a contiguous area of the appropriate spatial scale or individual strata, above the levels prescribed by minimum average tree or sapling densities in **Attachment A**, the contiguous area or whole strata must be remove from the CEA.

4. Reporting

The content of the regeneration checks report is largely the same as for the initial stratification and additionally must include:

- The information and data associated with the GIS polygon shape files, or grid files if using raster datasets, and GIS point files (e.g. for fieldwork) for both the initial stratification and the regeneration check re-stratification, and
- Additional information as required under the initial stratification phase for any new CEA that has not previously been provided (e.g. new pre-existing forest cover assessment).

4. Attainment of forest cover



Purpose

To meet the requirements in s9AA(3) of the CFI Rule that forest cover has been attained for HIR and NFMR projects.

When

Evidence of the attainment of forest cover must be submitted in the first offsets report submitted covering CEAs that have passed their forest cover assessment date[30].

What

Where proponents have completed an initial stratification procedure in accordance with the procedure outlined in Part B or in accordance with administrative arrangements, then the accepted stratification procedure can be used to determine if CEAs past their forest cover assessment date meet the forest cover attainment requirements. Mapping must be undertaken at a scale of 0.2ha where proponents are not using the most recent version of National Inventory maps to demonstrate attainment of forest cover, and meet the other forest cover assessment requirements in section 9AA of the CFI Rule.

Irrespective of the procedure used to identify forest cover has been attained at the forest cover assessment date, it is expected that any pre-existing forest cover will be re-assessed with the same data sources and data processing approaches and procedure and where pre-existing forest is identified, be excluded.

Any offsets report including a CEA past its forest cover assessment date which has not attained forest cover, cannot be issued credits. The offsets report must exclude the ineligible CEA, utilising s 77A of the CFI Act as appropriate. If the excluded CEA attains forest cover at a later date, it may be reported in a new offsets report.

Where proponents have required the use of administrative arrangements, and were unable to fully comply with the procedures outlined in Part B, then the Clean Energy Regulator will require the same procedures (including consistent data source and methodology) that were applied at the point of forest attainment to verify that there was no pre-existing forest cover in the CEA and that forest cover has been attained at the 0.2ha scale.

Agency review

As mentioned in the initial stratification gateway, pre-existing forest cover and forest cover achievement must be assessed at the same scale and in the same manner.

[30] Forest cover assessment date has the same meaning as that given by section 9AA(6) of the CFI Rule

Attachment A: Tree density for HIR and NFMR projects

Purpose

To demonstrate forest potential in survey plots (see *Attachment C: Field Validation for Training and Map Accuracy Assessment and Regeneration Surveys*), the number of trees or shrubs of species found to reach two metres tall in the project area must exceed levels that could be expected to achieve the 20 per cent crown cover required. The levels are lower for earlier years due to the potential for a further recruitment event.

Note: the number of individual trees or shrubs, not the number of stems is the appropriate density metric.

Tree density data collection

Tree densities of species shown to grow above two metres tall in the project area must be collected in the survey plots set out according to **Attachment C**. Data on species unlikely to grow 2m tall can also be collected but must be distinguished from those that can attain two or more metres in height in the project area, and will not be considered when assessing progress towards forest cover.

Projection of mature canopy cover from density data

Converting tree densities to an estimate of crown cover for an area requires an estimation of the mature crown diameter of trees for each species. Estimates can be sourced or derived from:

Estimating mature crown data from the project area

Crown diameters of mature specimens of each species should be measured within the project area for any species that is more than 2m in height at maturity. This could include the use of drone imagery. Data from other validation plots used for training, map accuracy assessment or regeneration should provide a base sample that can be supplemented by additional randomly selected trees.

Estimating mature crown data from government and scientific data

Where there is insufficient local data (for example, no mature trees), estimates of crown cover can be derived from government and scientific data (for example, QLD CORVEG data: https://publications.qld.gov.au/dataset/re-technical-descriptions).

Estimation of mature crown cover percentage

Expected mature crown cover can be estimated by:

- Converting the average mature crown diameter to crown area per tree at maturity [π x (1/2 x mature crown diameter in metres)] for each species.
- Multiplying the tree counts of each species by the average crown area per tree at maturity for that species to get mature crown area for each species.
- Summing up all the mature crown area for each species that gets over two metres tall to get the total crown area for the plot (in metres square).
- Dividing the total crown area for the plot by the total square metres in the plot to get the expected mature crown cover percentage.

Minimum number of trees per hectare estimated to achieve 20 per cent crown cover in a stand of trees is presented below (sourced from the explanatory statement for the Native Forest from Managed Regrowth Methodology Determination).

Table 1: Minimum number of trees per hectare to achieve 20 per cent crown cover in a stand of trees

Mature crown diameter per tree (m)	Crown area per tree at maturity (m2)	Crown area per tree at maturity (ha)	Minimum number of trees per hectare required for 20% crown cover* at initial stratification and regeneration check at year six	Minimum number of trees per hectare required for 20% crown cover* at later regeneration check at year 10
5.0	19.63	0.00196	51	102
4.5	15.90	0.00159	63	126
4.0	12.57	0.00126	80	160
3.5	9.62	0.00096	104	208
3.0	7.07	0.00071	142	283
2.5	4.91	0.00049	204	408
2.0	3.14	0.00031	318	637

** Crown cover of 20% divided by crown area per tree at maturity.*

Attachment B: New requirements for CFI mapping guidelines

The Department of the Environment and Energy and the Clean Energy Regulator will move requirements from these guidelines into the CFI Mapping Guidelines over time. While other suitable components might be identified, initially, changes to the CFI Mapping Guidelines to reflect the process in the guidelines may include:

- polygons in the initial stratification must be delineated with:
  - » a contiguous shape
  - » minimum size of 0.2ha, and
  - » minimum width of 25m. This minimum width is not part of the forest definition, but required when using very high resolution data.
- options regarding the process of creating these polygons
- where and how remote sensing data should be used to map areas during preliminary classification
- where and how exclusion areas will be classified
- the identification and sampling of survey points, and
- the removal of strata from CEAs where required.

Attachment C: Field validation for training and map accuracy assessment and regeneration surveys

The Clean Energy Regulator expects that proponents will develop specific survey techniques for field validation, map accuracy assessment and regeneration surveys. Proponents are expected to consult method guidance documents, and seek professional advice on appropriate methods. The selected methods must meet the minimum requirements outlined below.

- Survey plot types must be consistent for a CEA or strata and can be (but are not limited to):
  - a fixed orthogonal area and shapes with definite spatial boundaries
    - e.g. belt transect with a defined length and width, or
    - e.g. star plots.
- The following data must be collected for survey plots:
  - photographs appropriate to the sampling type
    - e.g. temporary or permanent away point photograph facing N, S, E and W
    - e.g. plot photo including a measure of scale for height)
  - location coordinates as per the CFI Mapping Guidelines
  - woody species present that could exceed 2m
  - stem density of each species, and
  - the height of any species expected to meet 2.0m at maturity, to the nearest 0.5 m
- The following data is recommended, but not required to be collected for survey plots:
  - species biomass
  - canopy cover
  - age-class
  - diameter at breast height, and
  - any other data considered to relevant to stratification.