Cassowary Credits

Rainforest Replanting Methodology

ecomarkets
AUSTRALIA

RAINFOREST REPLANTING METHODOLOGY FOR THE CASSOWARY CREDIT SCHEME

Version 1.1

May 2025

Cath Moran, Bronwyn Robertson, Penny Scott,
Don Butler, Kylie Freebody, Keith Smith, Travis Sydes

TERRAIN
NATURAL RESOURCE MANAGEMENT

CATH MORAN ECOLOGICAL CONSULTANCY

QUEENSLAND GOVERNMENT

Acknowledgements

We acknowledge Aboriginal and Torres Strait Islander Peoples of Australia as the Traditional Owners of this Country, and Rainforest Aboriginal Peoples as the Traditional Owners of the Wet Tropics region of Australia. We acknowledge their ongoing connections to Country and pay respects to their Elders.

The Cassowary Credit Scheme has been developed and delivered in partnership with a range of technical and community experts and organisations. Members of the Cassowary Credit Technical Working Group (TWG) have provided feedback and recommendations on the overall design and features of the scheme, particularly in relation to this accounting methodology. Members of the TWG are Don Butler (Queensland Department of Environment and Science); Kylie Freebody (Tablelands Regional Council (TRC)); Amanda Freeman (Nature North); Barry Hunter (Terrain NRM Board); Daryl Killin (Native Conifer Carbon Sink); Barbara Lanskey (Trees for the Evelyn and Atherton Tablelands (TREAT)); Angela McCaffrey (TREAT); Michael Morta (Terrain NRM); Tony O'Malley (Terrain NRM); Peter Rowles (Cassowary Recovery Team, C4); Luke Shoo (GreenCollar); Keith Smith (Queensland Department of Environment and Science); Travis Sydes (Far North Queensland Regional Organisation of Councils (FNQRoC)); Carole Sweatman (GreenCollar); Jarrad Holmes (PEC Consultants); Gabrielle Davidson (Landscape Ecological Services); Ellen Weber (Wet Tropics Management Authority); David Westcott (CSIRO) and Tim Wong (Wet Tropics Management Authority).

Carla Catterall (Griffith University) provided expert review of earlier drafts of this and related documents that substantially improved the underlying rationale and proposed approach, and also had substantial input to revision and pilot testing of the field protocol underpinning this methodology.

Data were provided for use under agreed conditions in developing the Cassowary Credit Scheme by the following people: Carla Catterall (Griffith University), Kylie Freebody (TRC) and Luke Shoo (GreenCollar). Data providers have had opportunity to review the use and interpretation of their data in the methodology and have made many valuable suggestions, corrections and other contributions.

Miriam Goosem, Susan Laurance and Ana Palma (James Cook University) provided advice, feedback and data on vegetation regeneration patterns and data in the Wet Tropics.

Technical input and advice from several GreenCollar staff members is gratefully acknowledged: Nerida Bradley, Don Butler, Anjali Nelson, Joanna Osborn and Luke Shoo.

The approach to non-native plants greatly benefitted from discussions with and input from Peter Snodgrass (Queensland Parks and Wildlife Service), the FNQRoC Natural Asset Management Advisory Committee, as well as members of the Cassowary Credit Scheme TWG.

The development of the Cassowary Credit Scheme was coordinated by Terrain NRM, with input from a range of staff who are not co-authors of this document, including Chelsy Maloney, Sarah Hoyal, Stewart Christie, Deb Bass, Andrew Dennis, Jacqui Diggins, Evizel Seymour, Tony O'Malley, Elaine Seager, Michael Morta, Tom Crow, Max Twist and Christine Wolf.

Traditional Owner groups of the Wet Tropics region provided feedback on the Cassowary Credit Scheme, including approaches to incorporating benefits to Rainforest Aboriginal People. These groups included: Abriculture, Djabugay Native Title Aboriginal Corporation RNTBC, Gimuy Walubara Yidinji, Girringun Aboriginal Corporation, Gunggandji-Mandingalbay Yidinji Peoples PBC RNTBC, Jabalbina Yalanji Aboriginal Corporation and Mamu Aboriginal Corporation RNTBC.

The Aboriginal Carbon Foundation provided feedback and input on incorporating benefits for R Aboriginal and Torres Strait Islander People and communities into the design of the Cassowary Credit Scheme.

Development of this Methodology has also benefitted from discussions with the Accounting for Nature Independent Science Committee.

Funding to support the study into the feasibility, design and delivery of the Cassowary Credit Scheme was provided by the Queensland Government's Land Restoration Fund, with additional project funding provided by World Wide Fund for Nature Australia.

Table of Contents

1. This document 1
2. Background 1
   2.1 Governing documents 1
   2.2 References to tools and documents 1
   2.3 Summary description of Methodology 2
   2.4 Types of Projects 2
   2.5 Definitions 3
3. Documentation requirements 5
   3.1 Project Application 5
   3.2 Project Reporting 6
      3.2.1 Notification of Commencement of Project Activities and Reporting Baseline Condition 6
      3.2.2 Notification of Planting Date 6
      3.2.3 Notification of Protection 7
      3.2.4 Annual Report 7
      3.2.5 Monitoring Report 8
      3.2.6 Notification of Reversal 8
   3.3 Application for Cassowary Credits 8
4. Project eligibility 9
   4.1 Location 10
   4.2 Approved Operators 10
   4.3 Project Activities 11
   4.4 Exclusions 11
   4.5 Land use change 12
   4.6 Additionality 12
   4.7 Permanence Period 12
   4.8 Risk of Reversal 13
   4.9 Leakage 13
5. Project mapping 14
   5.1 Geospatial imagery 15

5.2 Fitness-for-purpose 15
5.3 Delineation of different Methodology Areas 15
5.4 Stratification of Management Units 15
5.5 Replanting Methodology Area as a Management Unit 17
6. Project Accounting 17
6.1 Step 1. Calculate Condition Score 18
6.1.1 Model of Expected Condition in Ecological Plantings 19
6.1.2 Compulsory Field Measurement Years 20
6.1.3 Field Sampling Protocol for the Measurement of Indicators in Rainforest Replanting 21
6.2 Step 2. Quantify Creditable Condition 26
6.3 Step 3. Calculate Change in Condition 27
6.4 Step 4: Calculate Condition Improvement Units (CIUs) 27
7. Project Reporting 28
8. Verification 28
9. Issuance of Cassowary Credits 28
9.1 Minimum and Maximum Planting Ages 28
9.2 Calculation of Cassowary Credits 28
9.3 Deductions 29
9.4 Application for Cassowary Credits 29
Appendix A. Reference Benchmark values for Indicators of Condition 31
Appendix B. Table of expected Condition Scores at different Planting Ages 32
Appendix C. Table of Target Scores for Indicators at given Planting Age 33

1. This document

This document is Version 1.1 of the *Rainforest Replanting Methodology for the Cassowary Credit Scheme in the Wet Tropics* (the Rainforest Replanting Methodology). This document sets out the Methodology for accounting for the improvement in rainforest Condition as a result of replanting native rainforest vegetation in the Cassowary Credit Scheme (the Scheme).

This Methodology should be read in conjunction with the Governing Documents listed in Section 2.1. These will be updated from time-to-time and the most up-to-date version of each document should be used.

2. Background

2.1 Governing documents

Cassowary Credit Scheme Guide.

Cassowary Credit Scheme Standard.

Cassowary Credit Scheme Definitions.

Cassowary Credit Scheme Reversal Procedure.

2.2 References to tools and documents

This Methodology references the following tools and documents. These will be updated from time-to-time and the most up-to-date version of each document should be used.

Model of Expected Condition in Ecological Plantings

Models of Target Scores for Indicators

Cassowary Credit Scheme Replanting Additionality Calculator

Field Sampling Protocol for the Measurement of Indicators in Rainforest Replanting

Explanatory Statement for the Rainforest Replanting Methodology for the Cassowary Credit Scheme

Project Application template

Project Plan template

Permanence Plan template

Annual Report template

Monitoring Report template

Notification of Commencement of Project Activities template

Notification of Planting Date template

Notification of Protection template

Notification of Reversal template

Application for Cassowary Credits template

2.3 Summary description of Methodology

This Methodology describes the approach to quantifying and Verifying increases in rainforest Condition resulting from replanting in the Australian Wet Tropics, as the basis for determining the generation of Cassowary Credits.

The core components of this Methodology are:

1. *Project Eligibility:* the criteria for eligible projects under this Methodology and the *Cassowary Credit Scheme Standard* (the Standard).
2. *Mapping:* requirements for defining the spatial boundaries of Project Areas, Replanting Methodology Area(s) and for stratifying these areas into Management Units.
3. *Project Accounting:* the steps that must be taken to quantify any improvement in the Condition of rainforest resulting from Project Activities and includes details on the following:
    a. Quantify the Condition of Management Units.
    b. Calculate Creditable Condition by quantifying Additionality.
    c. Calculate the Change in Condition since previous calculation of Credits (Condition Improvement Units).
4. *Reporting*: reporting requirements associated with application of this Methodology.
5. *Verification*: Verification requirements for application of this Methodology and in accordance with the Standard.
6. *Issuance of Cassowary Credits:* processes and requirements for applying for issuance of Cassowary Credits, as well as the basis for calculating Cassowary Credits, including deductions e.g., Withholding Credits[1] and Risk of Reversal Buffer[2] and application of the applicable Conversion Factor.

2.4 Types of Projects

The scope of this Methodology includes the design and implementation of new planting activities that aim to increase the current extent of rainforest in the Wet Tropics Bioregion through planting of stems or direct seeding on cleared or heavily modified land.

The Rainforest Replanting Methodology does not specify the on-ground restoration techniques or practices that can be used to replant in the Methodology Area and Proponents may prepare, establish and manage replantings using whatever approaches are considered appropriate, effective and efficient. This provides scope for innovation in restoration planting design and implementation. However, there is a requirement that Target Scores for Indicators at specified Planting Ages are met (Target Scores are shown in Appendix C. Table of Target Scores for Indicators at given Planting Age), noting that the Target Scores are derived from models that use data collected from vegetation that has been planted and managed in a particular way, referred to as Ecological Planting techniques in this Methodology (see Box 1. Specific techniques required to qualify as an Ecological Planting under this Methodology).

[1] 5% of Credits from Projects applying this Methodology will be retained temporarily by the Secretariat as Withholding Credits. Upon Validation of the final Monitoring Report showing 25-year Target Scores have been met and 25-year Threshold Values have not been exceeded, these Withholding Credits will be released by the Secretariat to the Proponent's Registry Account.

[2] the Risk of Reversal Buffer is applied as a 5% discount on all Projects and will be held by the Secretariat in a Risk of Reversal Buffer account, in accordance with the Cassowary Credit Scheme Standard.

2.5 Definitions

The following terms are used in this Methodology as defined below. Any terms that are used in this Methodology and are not defined here have the meaning defined in the most up-to-date version of *Cassowary Credit Scheme Definitions.*

Baseline Condition – a measure of the Condition of rainforest in a Monitoring Site before the commencement of Project Activities. Baseline Condition must be established using Field Measurements and reported in a Monitoring Report which must be submitted with the Notification of Commencement of Project Activities in each Management Unit.

Cassowary Credit Scheme Replanting Additionality Calculator – the tool used to calculate any deductions resulting from the Counterfactual case (e.g., the benefit that could have arisen from other processes if Project Activities had not been undertaken e.g., biodiversity values of spontaneous Secondary Regrowth) that must be applied when calculating the Creditable Condition that will be used as the basis for Crediting Projects using the Rainforest Replanting Methodology.

Change in Condition – measured as the difference between the Condition Scores at the beginning and end of the time period. Used to quantify the benefit of Project Activities over that period.

Compulsory Field Measurement Year – refers to the specified Planting Ages when Field Measurement of Indicators must be taken. In this Methodology, Compulsory Field Measurement Years are the 12-month period starting on the 5th, 10th, 15th and 25th anniversary of the Planting Date for the Management Unit, in addition to the Baseline Condition Field Measurement required before commencement of Project Activities (i.e., Year 0).

Condition – a measure of the value of rainforest, based on attributes relating to the composition, structure and function of rainforest ecosystems.

Condition Improvement Unit (CIU) – the means by which the Change in Condition generated by a Project can be converted to Cassowary Credits. CIUs are calculated for a specified time period and do not include any Change in Condition that has already been used to calculate Cassowary Credits.

Condition Score – the quantified measurement of Condition at a given time, calculated from values of Indicators.

Creditable Condition – the component of the Condition Score that can be attributed to the Project Activities. This is quantified by subtracting any counterfactual or non-additional benefit that could have arisen if the Project did not happen.

Crediting Period – the time interval during which this Methodology can be applied to quantify the benefit to rainforest biodiversity arising from Project Activities for the purpose of generating and claiming Cassowary Credits. For Projects using the Rainforest Replanting Methodology, the maximum Crediting Period is twenty-five (25) years, except where an extension has been approved by the Secretariat, for example, in the case of a Significant Reversal and following application of the Reversal Procedure.

Ecological Planting – a suite of specific approaches to establish and manage rainforest replanting that are specifically intended to promote and accelerate forest regeneration processes by creating conditions suited to the input and recruitment of rainforest seeds and the growth and survival of rainforest seedlings.

Field Measurement(s) – the Field Measurements taken to determine the value of Indicators. Field Measurements must be taken for all Projects in Compulsory Field Measurement Years, as well as for Project Accounting in certain Projects to calculate Condition in years other than Compulsory Field Measurement Years.

Field Sampling Protocol – refers to the specified format for measuring the Indicators in Projects where the Rainforest Replanting Methodology is applied.

Indicator – a measurable attribute or characteristic that reflects the Condition of rainforest. Indicators that are pertinent to this Methodology are native tree canopy cover; density of medium and large native tree stems; the species richness of native tree, shrub and vine recruits; the cover of non-native grasses and the abundance of other non-native plants.

Model of Expected Condition in Ecological Plantings – a modelled trajectory of Condition at different Planting Ages based on previous scientific measurements of Indicators in variously aged ecological rainforest plantings in the Wet Tropics Bioregion. Projects that are established and managed using specific techniques can use the Model of Expected Condition to estimate the Condition Score in the Management Unit, except in scheduled Compulsory Field Measurement Years.

Model of Expected Condition – see Model of Expected Condition in Ecological Plantings.

Monitoring Plot – the physical area where Field Measurement of Indicators is conducted within a Management Unit. A Monitoring Plot comprises a 20x50 m rectangular survey area (0.1 ha) centred on a 50 m linear transect. A minimum of two (2) Monitoring Plots, 0.2 ha in total area, are required for every Monitoring Site.

Monitoring Site – one Monitoring Site comprises two (2) Monitoring Plots and is 0.2 ha in total area. A minimum of one (1) Monitoring Site is required for every Management Unit; more than one Monitoring Site is required in Management Units >4.4 ha in area.

Notification of Commencement of Project Activities – relates to the requirement in the Rainforest Replanting Methodology for notification by the Proponent to the Secretariat of the date when Project Activities commence for the purpose of ensuring that Baseline Condition was measured before Project Activities started.

Permanence Period – the period of time during which it is assured by the Proponent that the benefits to rainforest biodiversity achieved by a Cassowary Credit Scheme Project will not be reversed. For Projects using the Rainforest Replanting Methodology, the minimum Permanence Period is the same as the Crediting Period (i.e., twenty-five (25) years, except where an extension has been approved by the Secretariat, for example, in the case of a Significant Reversal and following application of the Reversal Procedure).

Planting Age – starts on the Planting Date. One (1) year of age is 12-months after the Planting Date and so on.

Planting Date – the date on which tree stems or seeds are planted at the Project Area. In situations where different areas within the Management Unit are planted on different days, the Planting Date can be the midpoint of the period over which planting occurred providing the period between the first and last planting day is not longer than four months. If planting extends over a longer period than four months, the area must be stratified into different Management Units with different Planting Dates.

Project Activities – the interventions or actions taken by the Proponent to undertake the Project. In application of this Methodology, these can include on-ground works such as fencing, site preparation, planting and ongoing maintenance.

Protection – relates to the prohibition of clearing[3] or activities that could result in a decline in the condition or extent of rainforest vegetation[4] in a Project Area or part thereof. The protection must be legally enforceable and apply to current and future landholders.

Reference Benchmark – refers to the average of measured values of Indicators in undisturbed or mature rainforest.

Replanting Additionality Calculator – see Cassowary Credit Scheme Replanting Additionality Calculator.

Replanting Methodology Area – the area over which this Rainforest Replanting Methodology is to be applied. There may be more than one Replanting Methodology Area in a Project Area.

Secondary Regrowth – the spontaneous (unmanaged) changes in composition, structure and floristics that occur through natural ecological processes such as plant growth and reproduction, seed dispersal and plant recruitment in rainforest vegetation that has been cleared or disturbed.

Significant Reversal - a decline in Condition in a Management Unit causing values for any of the Indicators to fall below Target Scores or to exceed Threshold Values for the given Planting Age that affects 1 hectare or 5% of the Management Unit (whichever is smaller).

Target Scores – specified values for Indicators that must be achieved at given Planting Ages. Based on measurements of Indicators from rainforest plantings at different ages in the Wet Tropics Bioregion.

Threshold Values – specified maximum allowable values for the cover of non-native grasses and abundance of other non-native plants at particular Planting Ages.

Withholding Credits – in the application of this Methodology, 5% Withholding Credits will be retained by the Secretariat until the end of the Crediting Period. Upon Validation of the final Monitoring Report showing 25-year Target Scores have been met and 25-year Threshold Values have not been exceeded, these Withholding Credits will be released by the Secretariat to the Proponent's Registry Account.

3. Documentation requirements

3.1 Project Application

When applying to Register a Project, the Project Application must include:

a. Names and consent of the Project Proponent and all key parties with interest in the land parcel or enterprise[5].
b. Agreements with landholders and/or Rainforest Aboriginal People, as relevant.
c. The name and version of the applicable Standard and Methodology at the time of Application.
d. Statements showing how the Project complies with all Scheme requirements, including general eligibility and project requirements of the Standard.
e. Project Area, including spatial files showing all relevant land parcels where Project Activities will occur.

[3] This does not include selective removal of native vegetation permitted in the Scheme Standard.

[4] Within the bounds permissible by existing relevant legislation, such as the *Mineral Resources Act 1989*.

[5] Note that consent is required from all eligible interest holders (e.g., those persons or organisations listed on the land title as having an interest in the property) and may include financial institutions that hold a mortgage over the property, registered Native Title bodies, or (in the case of Crown land), the relevant Minister.

f. Project Area in relation to Wet Tropics Bioregion and pre-European extent of the rainforest and scrubs Broad Vegetation Group (see Section 4.1).
g. Project Area in relation to mapped existing vegetation (see Section 4.1).
h. Methodology Area(s), including spatial files showing areas within the Project Area where different Methodologies will be applied.
i. Management Unit(s), including spatial files showing areas within the Replanting Methodology Area(s) where there are different Planting Dates and/or there are reasons to expect that there will be substantial variation among the areas in their Change in Condition[6].
j. Project Plan, which includes the proposed on-ground approach(es) to establishing and managing planted rainforest vegetation in the Replanting Methodology Area(s)). Where a Methodology Area is stratified, the Project Plan must identify the approach to be used in each Management Unit. The Project Plan must be prepared or reviewed by an Approved Operator and must describe how the proposed Project Activities will contribute to achieving Target Scores for Indicators.
k. Permanence Plan that confirms the minimum Permanence Period[7] for the Project. The Permanence Plan must be prepared or reviewed by an Approved Operator and must identify potential risks to Permanence during the Permanence Period and describe all reasonable, practical and feasible actions that will be taken to protect Project outcomes for the duration of the Permanence Period.

Once all requirements are met, the Secretariat will Validate the Project Application and Register the Project.

3.2 Project Reporting

3.2.1 Notification of Commencement of Project Activities and Reporting Baseline Condition

Project proponents must notify the Secretariat when Project Activities commence in each Management Unit. If the spatial area of the Management Unit has changed since the Project Application, an updated spatial file showing the boundary of the Management Unit must also be submitted. Project Activities include works such as fencing, control of non-native plants (including grasses) and other activities involved in site preparation, as well as planting and ongoing management.

The Baseline Condition of each Management Unit must be established using Field Measurements before the commencement of any Project Activities (that is, in year zero (0)) and reported in a Monitoring Report (Section 3.2.5). The Monitoring Report that reports results of Baseline Condition measurements must be submitted together with the Notification of Commencement of Project Activities in each Management Unit and any updated spatial files showing Management Unit boundaries, if these have changed since the Project Application was submitted.

3.2.2 Notification of Planting Date

Proponents must notify the Secretariat of the Planting Date (the date when stems or seeds are planted) in each Management Unit. In situations where different areas within the Management Unit are planted on different days, the Planting Date can be the midpoint of the period over which planting occurred, providing the period between the first and last dates when stems or seeds were planted is not longer than four months. If planting extends over a

[6] Management Units should be delineated if they are known at the time of Application but can be adjusted and additional Management Units can be included over time.

[7] The minimum Permanence Period for Projects using this Methodology is the same as the Crediting Period (i.e., twenty-five (25) years, except where an extension has been approved by the Secretariat, for example, in the case of a Significant Reversal and following application of the Reversal Procedure).

longer period than four months, the area must be stratified into different Management Units with different Planting Dates.

The 25-year Crediting Period for the Project will start on the Planting Date. The Planting Date will be used to calculate Planting Age.

3.2.3 Notification of Protection

A Notification of Protection may be submitted by the Proponent to the Secretariat at any time during a Project's Crediting Period. A Notification of Protection must:

a. Be prepared by an Approved Operator; and
b. Include evidence that replanted rainforest vegetation is under Protection, including the prohibition of clearing[8] or activities that could result in a decline in the condition or extent of rainforest vegetation[9] in a Project Area or part thereof. The protection must be legally enforceable and apply to current and future landholders; and
c. Include spatial files that clearly show the area protected in relation to the Project Area; and
d. Quantify the proportion of each Management Unit (or Methodology Area or Project Area, if these areas are not stratified) that is under Protection.

Upon Validation of the Notification of Protection by the Secretariat, the Proponent will be eligible to apply a higher Conversion Factor (20% higher than the standard Conversion Factor) in their calculation of Cassowary Credits for that proportion of the Project Area that is protected. The higher Conversion Factor can be used in any Applications for Cassowary Credits submitted after the Validation date for the Notification of Protection (see Section 9.3 Calculation of Cassowary Credits).

3.2.4 Annual Report

Annual Reports must be submitted every year, starting 12 months after the Planting Date. Proponents have 12 weeks from the due date to submit their Annual Report.

Annual Reports must show evidence that the Project has been implemented in accordance with the approved Project Plan. Such evidence could include, but is not limited to:

- Receipts (e.g., for purchase of native seedlings);
- Diary entries detailing project works completed by the Project Proponent;
- Date-stamped photos of Project Activities;
- Photo monitoring points showing before and after photos;
- Aerial imagery of Project Activities;
- Evidence of engagement of Approved Operator(s) as listed on the Cassowary Credit Scheme website;
- Invoices from Approved Operator(s) for work on the Project.

Field Measurements of Indicators are not required to be reported in Annual Reports.

[8] This does not include selective removal of native vegetation permitted in the Scheme Standard.

[9] within the bounds permissible by existing relevant legislation, such as the *Mineral Resources Act 1989*.

3.2.5 *Monitoring Report*

Monitoring Reports must be prepared by an Approved Operator. A Monitoring Report will be required for each Management Unit in Compulsory Field Measurement Years,[10] including year zero (0) (see Section 6.1.2). In Compulsory Field Measurement Years, the Monitoring Report must report on the results of Field Measurements of Indicators in the Management Unit.

A Monitoring Report is also required at any time an Application for Cassowary Credits is submitted. The Monitoring Report must be Validated by the Secretariat before an Application for Cassowary Credits can be Validated and Credits issued. If the Application is submitted in a Compulsory Field Measurement Year, the results reported in the Monitoring Report will be based on Field Measurement of Indicators for all Projects. If an Application for Cassowary Credits is submitted in a year other than a Compulsory Field Measurement Year, the results reported in the Monitoring Report depend on the approach used to establish and maintain the replanted rainforest vegetation.

- **For Projects using Ecological Planting techniques**, Proponents can elect to use either the results of Field Measurement of Indicators or the values of Indicators in the *Model of Expected Condition in Ecological Plantings* (the Model of Expected Condition) together with a declaration about the cover of non-native grasses and the abundance of other non-native plants in high and low impact categories.
- **For Projects that do not use Ecological Planting techniques,** Proponents must report the results of Field Measurement of Indicators.

Results must be reported at the level of Monitoring Site and in relation to Target Scores for each Indicator at the given Planting Age. Results of Project Accounting must also be reported for each Management Unit in Monitoring Reports, including the calculation of Condition Score, Creditable Condition and Condition Improvement Units (CIU) for each Management Unit.

If Field Measurements show that Indicators do not meet the Target Scores for canopy cover, number of recruit species or density of medium and large stems, or if values for the cover of non-native grasses or the abundance of non-native plants exceed the Threshold Values specified for that Planting Age, the Project Proponent must prepare and submit a statement explaining reasons why this is the case and describing actions that will be taken to ensure that Target Scores will be achieved in subsequent Field Measurements. The Secretariat will not Validate an Application for Cassowary Credits if a Monitoring Report shows Target Scores have not been met or Threshold Values have been exceeded. If Target Scores are not met or Threshold Values are exceeded in two successive Monitoring Reports, the Secretariat may apply their Compliance Procedure.

If all requirements are met, the Secretariat will Validate the Monitoring Report.

3.2.6 *Notification of Reversal*

In the event of a Significant Reversal, the Proponent must submit a Notification of Reversal to the Secretariat within 90 days and follow all requirements relating to Reversals in the Standard. Following Notification of a Reversal, the Secretariat will apply the *Cassowary Credit Scheme Reversal Procedure* (the Reversal Procedure).

3.3 Application for Cassowary Credits

An Application for Cassowary Credits must be prepared by an Approved Operator. The Application for Cassowary Credits must be accompanied by a Monitoring Report that has been prepared within the past 6 months and

[10] Compulsory Field Measurement Years are the years when Planting Age is 0, 5, 10, 15 and 25.

Validated Annual Reports for the whole time period that is subject to the Application. Credit issuance is subject to Validation of the Monitoring Report by the Secretariat.

The Monitoring Report submitted with an Application for Cassowary Credits must include either the results of Field Measurement of Indicators or the Indicator values from the Model of Expected Condition (refer to Section 3.2.5 for conditions), as well as calculations of Condition Score, Creditable Condition and Condition Improvement Units (CIU) for each Management Unit.

An Application for Cassowary Credits must convert CIU to Cassowary Credits using the Conversion Factor, as described in Section 9.2. For Project Areas with a Validated Notification of Protection, the Proponent will be eligible to apply a higher Conversion Factor (20% higher than the standard Conversion Factor) in their calculation of Cassowary Credits for that proportion of the Project Area that is protected. The higher Conversion Factor can be used in any Applications for Cassowary Credits submitted after the Validation date of the Notification of Protection (see Section 9.3 Calculation of Cassowary Credits).

The Application for Cassowary Credits must include applicable deductions from calculations of Cassowary Credits, including:

i. Five percent (5%) Risk of Reversal Buffer, in accordance with the Cassowary Credit Scheme Standard; and
ii. Five percent (5%) Withholding Credits, which will be retained by the Secretariat until the end of the Crediting Period. Upon Validation of the final Monitoring Report showing 25-year Target Scores have been met and 25-year Threshold Values have not been exceeded, these Withholding Credits will be released by the Secretariat to the Proponent's Registry Account.

4. Project eligibility

This section outlines the criteria that define eligibility to Register a Project under this Methodology in the Cassowary Credit Scheme. For each of the eligibility criteria, credible evidence in the form of documentation is required as part of the Project Application.

Sections 4.1-4.9 provide a full description of the eligibility requirements summarised below:

- Projects must be wholly located in the Wet Tropics Bioregion.
- Project Areas must be in locations where the pre-clearing Broad Vegetation Group is classified as 'Rainforest and scrubs'.
- Project Areas must not contain existing native vegetation, which refers to remnant or high value regrowth, as defined in the Vegetation Management Act 1999.
- Project Areas must be in locations where existing native vegetation has not been deliberately cleared or damaged within five years of the submission of a Project Application, or if it has been, evidence must be provided that ownership of the property changed subsequent to the clearing.
- Proponents must use Approved Operators according to the Methodology, including:
  - for all Project Activities, including preparation, planting and maintenance of replanted rainforest; and
  - to provide seedlings or seeds for replanting; and
  - to prepare Project Plans, Permanence Plans, Monitoring Reports, Notifications of Protection and Applications for Cassowary Credits; and
  - to conduct Project Monitoring;

  unless the Secretariat has granted approval for an operator to be used who is not an Approved Operator.

- Projects must replant native rainforest plant species on cleared land by planting of seedlings or saplings or direct seeding.
- Projects must be compliant with all Federal, State and Local Government regulations.
- Projects must be new (i.e., not existing) planting activities.
- Projects must intend to increase the Condition of replanted rainforest so that it increases in similarity to natural rainforest.
- Projects must allow access to the Methodology Area and use of resources by native rainforest biodiversity, unless the rainforest replanting needs to be protected e.g., netted or fenced from predation or to protect from frost when it is young.
- Projects must only use netting or fencing or other infrastructure that is wildlife friendly or does not cause harm to wildlife.
- Projects must include either filling in or daily checking and clearing of any holes drilled, ripped or dug more than 24 hours before planting.
- Projects must use native rainforest plant species that could occur naturally at the Project Area:
    - as indicated in Goosem & Tucker (2013), the most recent Queensland flora census of the Wet Tropics Bioregion or other reputable regional list of native flora; or
    - as widely accepted as being native in the surrounding geographic area; or
    - including plant species that could occur naturally in the location under plausible scenarios of climate change.
- Projects must not result in loss or degradation of rainforest biodiversity outside of the Project Area e.g., by dumping non-native plants that have been removed from the Project Area in another area;
- Projects must be reported against the Project Plan which is approved as part of the Project Application.
- Projects must be monitored using the Feld Sampling Protocol specified in this Methodology by an Approved Operator.

4.1 Location

This Methodology can be applied in the Wet Tropics Bioregion in locations where the pre-clearing Broad Vegetation Group (BVG) is classified as 'Rainforest and scrubs' (Neldner *et al.*, 2023[11]). This Methodology cannot be applied in areas of existing vegetation. Existing vegetation refers to remnant or high value regrowth vegetation, as defined in the Queensland *Vegetation Management Act 1999*.

The Project Area must be located where native vegetation has not been deliberately cleared or damaged in order to reduce its Baseline Condition. The land must not have been cleared of native vegetation within five (5) years of the submission of a Project Application; or, if it was cleared in the previous 5 years, evidence must be provided that ownership of the property changed subsequent to the clearing.

4.2 Approved Operators

A list of Approved Operators is provided on the Cassowary Credit Scheme website.

[11] Neldner, V.J., Niehus, R.E., Wilson, B.A., McDonald, W.J.F., Ford, A.J. and Accad, A. (2023). The Vegetation of Queensland. Descriptions of Broad Vegetation Groups. Version 6.0. Queensland Herbarium and Biodiversity Science, Department of Environment and Science.

Approved Operators must be used for all Project Activities where this Methodology is being applied, including for the preparation, planting and maintenance of replanted rainforest in the Methodology Area and to provide seedlings or seeds for replanting. This includes Project Activities undertaken under contract or by the Proponent or landholder.

Approved Operators must prepare Project Plans, Permanence Plans, Monitoring Reports, Notifications of Protection and Applications for Cassowary Credits and must conduct Project Monitoring.

In situations where there is no Approved Operator available and able to meet the terms of service delivery (for example, within the timeframe, budget or to the standard required), the Proponent must advise the Secretariat and submit evidence showing there is no Approved Operator available and nominate an alternative operator, together with a statement describing how the skills, experience, insurances and systems of the nominated person(s) are commensurate with delivering the desired outcomes. The Proponent must obtain permission from the Secretariat to use their nominated operator before work commences.

If an Approved Operator is not available to undertake Project Monitoring or preparation of Monitoring Reports, additional Verification requirements may apply, according to the Standard.

4.3 Project Activities

Project Activities must:

1. Be compliant with all Federal, State and Local Government regulations;
2. Be new (i.e., not existing) planting activities;
3. Be intended to increase the Condition of replanted rainforest so that it increases in similarity to natural rainforest;
4. Allow access to the Methodology Area and use of resources by native rainforest biodiversity, unless the rainforest replanting needs to be protected e.g., netted or fenced from predation or to protect from frost when it is young;
5. Only use netting or fencing or other infrastructure that is wildlife friendly or does not cause harm to wildlife;
6. Include either filling in or daily checking and clearing of any holes drilled, ripped or dug more than 24 hours before planting;
7. Use native rainforest plant species that could occur naturally at the Project Area:
    a. as indicated in Goosem & Tucker (2013), the most recent Queensland flora census of the Wet Tropics Bioregion or other reputable regional list of native flora; or
    b. as widely accepted as being native in the surrounding geographic area; or
    c. including plant species that could occur naturally in the location under plausible scenarios of climate change;
8. Not result in loss or degradation of rainforest biodiversity outside of the Project Area e.g., by dumping non-native plants removed from the Project Area in another area;
9. Be reported against the Project Plan which is approved as part of the Project Application;
10. Be monitored using the Feld Sampling Protocol specified in this Methodology by an Approved Operator; and
11. Be carried out by an Approved Operator, as set out in Section 4.2.

Activities that may be eligible to participate in the scheme under this Methodology comprise revegetation of native rainforest plant species on cleared land, achieved by planting of seedlings or saplings or direct seeding.

4.4 Exclusions

Without limitation, the Cassowary Credit Scheme excludes projects on the negative list in the Standard, including those that:

- Occur in locations where native vegetation is designated to be cleared in the future e.g., major transport corridors; or
- Use plant species that are not native to the Wet Tropics Bioregion[12] and have the potential to become invasive; or
- Remove or degrade native vegetation at any time to generate a lower Baseline Condition; or
- Degrade the condition of native ecosystems; or
- Pose significant risk to native flora, native fauna or native ecosystems.

4.5 Land use change

If a Project involves a change in land use, the Proponent must have obtained any necessary authorisations.

4.6 Additionality

Projects must be able to meet Additionality requirements consistent with the Standard. Project Activities must not be required to be carried out by law or under any agreement, including as part of an offset condition or existing funding agreement. Projects using this Methodology may occur on land that is designated for conservation management (e.g., reserves), provided that there is no pre-existing legal or contractual requirement for the landholder to conduct replanting on that land.

For all projects, the *Cassowary Credit Scheme Replanting Additionality Calculator* (the Replanting Additionality Calculator) must be used to quantify any component of the Condition Score that could have arisen without Project Activities, for example from Secondary Regrowth or through participation in another ecosystem or environmental services market such as the Australian Carbon Credit Unit (ACCU) or Reef Credit Schemes (Section 6.2).

The component of the Condition Score that could have occurred without Project Activities will be deducted from the Condition Score to quantify the Creditable Condition. Cassowary Credit issuance will be based only on the Creditable Condition, so that only the Additional benefits generated by the Cassowary Credit Scheme Project are credited.

4.7 Permanence Period

The minimum Permanence Period for projects applying this Methodology is the same as the Project's Crediting Period (i.e., twenty-five (25) years, except where an extension has been approved by the Secretariat, for example, in the case of a Significant Reversal and following application of the Reversal Procedure). In the Permanence Plan (submitted as part of the Project Application), the Proponent must identify potential risks to Permanence and identify reasonable, practical and feasible actions to maintain Project outcomes for the duration of the Permanence Period. In the context of activities covered by this Methodology, Permanence refers to the level of assurance that replanted rainforest vegetation in the Methodology Area will not be cleared[13] and the duration of this assurance[14].

Proponents may elect to protect rainforest vegetation in the Methodology Area beyond the Permanence Period by establishing legal protection over the area independently of the Cassowary Credit scheme. Proponents can submit a Notification of Protection that has been prepared by an Approved Operator to the Secretariat at any time during the

[12] See 4.3(7)

[13] This does not include selective removal of native vegetation permitted in the Scheme Standard.

[14] Note that commitment to permanence requirements may require the consent of eligible interest holders (e.g., those persons or organisations listed on the land title as having an interest in the property) and may include financial institutions that hold a mortgage over the property, registered Native Title bodies, or (in the case of Crown land), the relevant Minister.

Crediting Period. The Notification of Protection must provide evidence that the area is protected from clearing or other activities that could result in a decline in condition or extent of the rainforest vegetation and that the protection is binding on current and future landholders. If the Notification of Protection is Validated by the Secretariat, the Proponent will be eligible to apply a higher Conversion Factor (20% higher than the standard Conversion Factor) to the calculation of Cassowary Credits for the protected area (see Section 9.2 Calculation of Cassowary Credits).

4.8 Risk of Reversal

In this Methodology, a Significant Reversal is an estimated decline in the value of any Indicator that causes it to fall below the Target Score for the given Planting Age and which affects more than 5% of the Project Area or more than 1 ha (whichever is smaller).

Proponents must identify potential causes of Significant Reversals in their Permanence Plan and identify reasonable, practical and feasible actions to minimise or mitigate the Risk of Reversal and maintain Project outcomes for the duration of the Crediting Period.

If a Significant Reversal occurs, Proponents must notify the Secretariat in accordance with the Standard and the Secretariat will apply the Reversal Procedure.

After application of the Reversal Procedure, if it is deemed reasonable, feasible and practical to restore the area affected by the Significant Reversal, the Proponent must work with an Approved Operator to develop a plan to restore the area and submit this as a schedule to their Project Plan. The Secretariat may apply certain conditions during the recovery following a Significant Reversal, in accordance with the Reversal Procedure (e.g., extending the Crediting Period for a maximum of five (5) years or pausing Crediting). If the Crediting Period is paused to allow additional time for the Condition of the vegetation to recover so that Indicators meet Target Scores or do not exceed Threshold Values in subsequent Field Measurements, the Planting Age is also paused for the same period.

4.9 Leakage

The intent of determining Leakage is to ensure that loss or degradation of rainforest biodiversity does not occur in an area outside of the Project Area, as a result of displacement of an existing land use from the Project Area. This could happen, for example if native vegetation was cleared or damaged to enable resumption of livestock grazing that had been displaced from the Project Area.

Leakage may be considered to occur if there is a decrease in the condition[15] or extent of rainforest biodiversity outside of the Project Area that is the result of Project Activities occurring in the Project Area. To be considered Leakage, the decrease in condition or extent of rainforest biodiversity must occur on land that is owned, managed or used by the same landholder or Proponent, regardless of the tenure of the land. In addition, Leakage must result from Project Activities.

At the time of Project Application, the Proponent must complete the following steps to determine if there is a risk of Leakage as a result of the Project and if so, the appropriate procedure to account for it.

[15] In this case, “condition” refers to the general sense of the term because rainforest vegetation in these areas may not necessarily have been replanted, so the concept of Condition used in this Methodology may not be appropriate.

Step 1. Determine if the landholder or Proponent is responsible for the management of any land outside the Project Area but within the Wet Tropics Bioregion. This could include land under any tenure, that is owned, used or managed by the same landholder or the Proponent.

If the answer is NO, then the risk of project Leakage is considered to be zero and the Proponent should proceed to Section 5 (Project Mapping). If the answer is YES, proceed to Step 2.

Step 2. The Proponent must determine the area of land potentially subject to Leakage. This would comprise areas of land that are: i) under control of the landholder or Proponent; ii) not in the Project Area; and iii) currently vegetated with native rainforest vegetation (including vegetation classed as remnant or high value regrowth in the Queensland *Vegetation Management Act 1999*).

Proponents should follow the same procedures for mapping land potentially subject to Leakage as described in Section 5.

Step 3. Once the area of land has been identified, the Proponent must determine the Credible Risk of loss or degradation of rainforest biodiversity on the land that is potentially subject to Leakage as a result of the Project Activities.

Credible Risk should be qualified as either likely or unlikely. This assessment should be based on information about the legal right to clear vegetation, such as land use and property management plans, the Queensland *Vegetation Management Act 1999*, and local planning overlays. If the Credible Risk is likely, the Proponent must prepare a Leakage statement outlining their intention to ensure that Leakage does not occur. The area must be Monitored for compliance with the Leakage statement and reported on at the end of each Monitoring Period.

Step 4. At the end of each Monitoring Period, the Project Proponent must provide evidence that management has been consistent with the intention to ensure that Leakage does not occur. If management has not been consistent with avoiding Leakage, the Secretariat may require the Proponent to provide evidence that there has not been a decline in condition or extent of rainforest biodiversity outside of the Project Area[16]. If this is not done, then the Project will not be eligible to receive Cassowary Credits until the Proponent can demonstrate that rainforest biodiversity affected by Leakage has been restored to its status at the time of Project Application.

5. Project mapping

The boundaries of the Project Area must be delineated in accordance with the requirements of this section.

For the purposes of identifying different Methodology Areas and stratification of these into different Management Units, the Proponent must use remotely sensed imagery.

[16] If there is a Credible Risk of Leakage and management is not consistent with avoiding Leakage, the Proponent must be able to provide evidence that there has been no decline in extent or condition of rainforest biodiversity outside the Project Area. This may require measuring baseline condition or extent prior to any change in the land use, such as using aerial imagery that shows extent of rainforest vegetation or using an appropriate, accredited Accounting for Nature method to measure the condition of the native rainforest vegetation or other rainforest biodiversity.

5.1 Geospatial imagery

A Proponent may use any of the following sources of data to delineate the boundaries and/or features within the Project Area:

a. Aerial LiDAR
b. Terrestrial LiDAR
c. UAV (drone)-derived photogrammetry
d. Air-photo photogrammetry
e. Ortho-rectified aerial photographs
f. Ortho-rectified satellite imagery
g. Cadastral database
h. GPS (including GPS-enabled devices such as a tablet).

The application of alternative mapping approaches may be used, but any approaches used must comply with the accepted and current best-practice requirements at the time of reporting, commensurate with the technique's spatial resolution and the "limit of detection" and its application within the Methodology.

5.2 Fitness-for-purpose

Prior to using a geospatial dataset, Proponents should assess its appropriateness for the intended use, or its fitness-for-purpose against criteria that include:

1. Age;
2. Scale;
3. Resolution;
4. Accuracy (horizontal accuracy (95% Confidence Interval) of at least 10m);
5. Signal-to-noise ratio ("limit of detection");
6. Classification, aggregation, generalisation systems (e.g., smoothing);
7. Integrity of dataset.

5.3 Delineation of different Methodology Areas

It is possible to apply different Methodologies in a single Project Area. These are distinguished in the Project Plan as different Methodology Areas. There may be multiple different Methodology Areas within a single Project Area, as long as all requirements outlined in the Standard regarding Projects with more than one Methodology are met. If only one Methodology is applied throughout the Project Area, there will only be one Methodology Area. Projects applying this Methodology will be in a Replanting Methodology Area. It is not necessary for the entire area within the Replanting Methodology Area to be contiguous (*Figure 1*). This Methodology cannot be applied in existing plantings or areas of existing vegetation[17].

5.4 Stratification of Management Units

A Replanting Methodology Area may be stratified into separate Management Units (*Figure 1*) if they have different Planting Dates and/or there are reasons to expect that there will be substantial variation among the areas in their Change in Condition, for example if different replanting techniques are used or if there is substantial variation in

[17] Existing vegetation refers to vegetation shown on the regulated vegetation management map in the Queensland *Vegetation Management Act 1999* and includes remnant vegetation and high value regrowth vegetation.

spatial patterns of disturbances or events. If the whole Methodology Area is planted at the same time, with the same techniques and is expected to show similar patterns of Change in Condition, the whole Methodology Area can be a single Management Unit (Section 5.5).

Where a Replanting Methodology Area is stratified into multiple Management Units, the Project Proponent must notify the Secretariat of the Baseline Condition, together with the date that Project Activities commence, as well as the Planting Date separately for each of the Management Units. If the spatial boundary of a Management Unit identified as part of the Project Application changes, updated mapping of Management Units must be submitted with the Notification of Baseline Condition and Notification of Commencement of Project Activities.

Note the spatial area to be stratified must be no smaller than the smallest grid size used to measure rainforest Condition (0.2 ha).

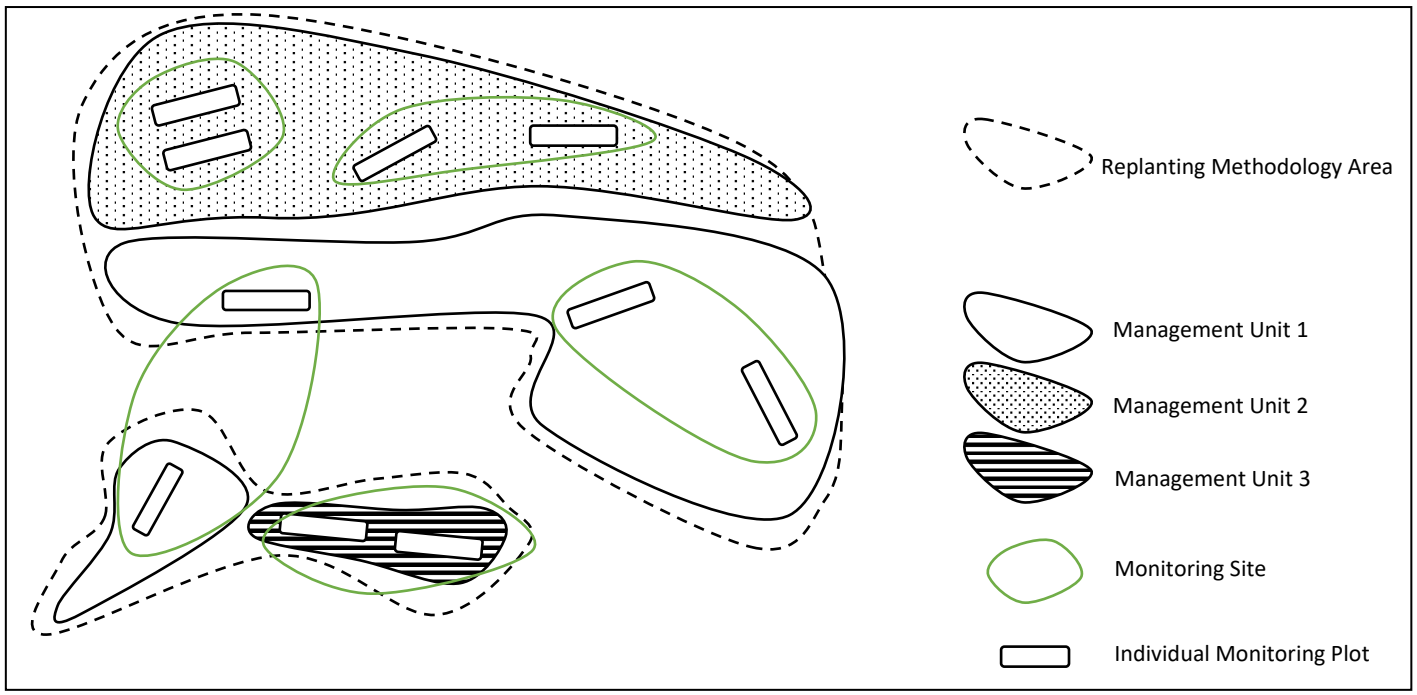

Figure 1. Conceptual sketch of stratification of a Replanting Methodology Area into multiple Management Units. The boundaries of the Methodology Area are shown using dashed lines. Areas within a Methodology Area need not be contiguous, as in this hypothetical example. A Methodology Area may be stratified into multiple Management Units. In the example there are three different Management Units within the single Methodology Area. The boundaries of the Management Units are shown using complete lines and Management Units 2 and 3 are differentiated using stippling and stripes. Monitoring Sites comprise two Monitoring Plots (small rectangles); the pair of Monitoring Plots comprising each Monitoring Site is shown using the green shape. Management Unit 1 (white fill) comprises two patches that are not contiguous. There are two Monitoring Sites (4 Monitoring Plots) in Management Unit 1; three of the Monitoring Plots are in the largest area comprising the Management Unit while the fourth Monitoring Plot is located in the smaller patch in the lower left hand section of the sketch. Management Unit 2 (stippled) also has four Monitoring Plots (across two Monitoring Sites), all located within the single contiguous patch that forms the Management Unit. Management Unit 3 (striped) is a small, contiguous patch comprising one Monitoring Site. The location of Monitoring Sites and Monitoring Plots within a Management Unit must be selected by an Approved Operator, in accordance with the Field Sampling Protocol.

5.5 Replanting Methodology Area as a Management Unit

A Replanting Methodology Area may be a single Management Unit as long as 1. the Baseline Condition is measured before Project Activities commence anywhere in the Methodology Area; 2. the area has the same Planting Date; and 3. the same planting techniques are used. The Rainforest Methodology Area would then be the Management Unit upon which measurement, reporting and crediting are based.

It is in the interest of the Proponent to stratify the Rainforest Methodology Area into multiple Management Units if it is likely that Condition will change at different rates across the Methodology Area. Otherwise, slow rates of Change in Condition in one part of the Management Unit will lower the Condition Score of the whole Management Unit, meaning that fewer Condition Improvement Units and therefore Cassowary Credits will be generated.

6. Project Accounting

The standard Crediting Period for all Projects using the Rainforest Replanting Methodology is 25 years. Cassowary Credits may be issued during the Crediting Period, providing values of Indicators are above specified Target Scores (for canopy cover, species richness of recruits and density of medium-large stems) and below Threshold Values (for

non-native grass cover and non-native plant abundance) in Compulsory Field Measurement Years (Section 6.1.2). For the issuance of final Cassowary Credits at the end of the Crediting Period (together with any Withholding Credits retained during the Crediting Period), Indicators must meet or exceed the Target Scores and be below the Threshold Values specified for 25-year-old plantings.

In accordance with the Standard and Reversal Procedure, the Crediting Period may be extended in special circumstances where a Significant Reversal has occurred. This extension would be at the discretion of the Secretariat and would be intended to allow additional time for the Condition of the vegetation to recover so that Indicators meet Target Scores and do not exceed Threshold Values in subsequent Field Measurements.

The sections below outline the steps that must be taken during the Crediting Period to quantify the creditable Change in Condition of rainforest in Management Units. For each Management Unit, the following must be calculated:

1. **Condition Score**: using either the Model of Expected Condition or Field Measurements;
2. **Creditable Condition:** using the Replanting Additionality Calculator to adjust the Condition Score; and
3. **Change in Condition:** by subtracting the previous Creditable Condition from the current Creditable Condition
4. **Condition Improvement Units:** by multiplying the Change in Condition by the extent of the Management Unit.

6.1 Step 1. Calculate Condition Score

Where a Methodology Area is stratified into multiple Management Units, the Condition Score is calculated separately for each Management Unit. Condition Scores are the first step in calculating the Condition Improvement Units (CIUs) for each Management Unit (Section 6.4).

The Condition of a Management Unit is based on the following Indicators (see *Table 3* for a description of how each Indicator is measured):

- Native tree canopy cover (*cover)*[18]
- Species richness of native plant recruits (*recruits*)[19]
- Density of medium-large stems of native trees (*stems)*[20]

$$\textbf{Condition Score} = (\boldsymbol{cover} * \mathbf{0.2}) + (\boldsymbol{recruits} * \mathbf{0.4}) + (\boldsymbol{stems} * \mathbf{0.4})$$

Where the variables ***cover, recruits*** and ***stems*** are the values expressed as a percent of the forest Reference Benchmark value (adjusted to account for values exceeding Reference Benchmarks). Reference Benchmark values for each Indicator are provided in Appendix A. The value for each variable will be between 0 and 100.

The Condition Score is calculated either using the Model of Expected Condition (Section 6.1.1) or direct Field Measurements of the Indicators (Section 6.1.3). Only projects established using the specified Ecological Planting techniques (Box 1) can use the Model of Expected Condition to quantify Condition Scores. Projects that use other planting techniques must always use Field Measurements of the Indicators to calculate Condition Score. During a

[18] measured as the average foliage projective cover across multiple points.

[19] measured as the number of tree, shrub or vine species of height 0.1-1.0 m per standard 500 m^2 area.

[20] the number of stems with a diameter of at least 20 cm in a one-hectare area.

Compulsory Field Measurement Year[21], all Projects – including Projects using Ecological Planting techniques - must use Field Measurement of Indicators to calculate Condition.

6.1.1 Model of Expected Condition in Ecological Plantings

The Model of Expected Condition is based on previous measurements of canopy cover, species richness of recruits and density of medium-large stems in 65 different ecological rainforest plantings of various ages in the Wet Tropics Bioregion. The Model of Expected Condition describes the expected Condition in an Ecological Planting at a given age, where Condition is measured using the Indicators and calculated as set out above. The Model of Expected Condition can be used to estimate Condition Scores in Management Units that have been established and managed using Ecological Planting techniques (Box 1), because Indicators – and therefore Condition Scores - in these areas are expected to be similar to the previously-measured sites. Expected Condition Scores are shown in Appendix B. In projects using specified Ecological Planting techniques, the Model of Expected Condition can be used to estimate Indicator values or Condition except in Compulsory Field Measurement Years; Field Measurement of Indicators must be used in these years. To meet Ecological Planting requirements, certain techniques must be used to establish and maintain the project (Box 1).

If the Model of Expected Condition is being used as part of the calculation of Condition, Proponents must also declare that non-native grasses and other non-native plants have been kept below the Threshold Values applicable to the Planting Age (See items 6 and 7 in Box 1).

[21] Compulsory Field Measurement Years are years 0, 5, 10, 15 and 25.

Box 1. Specific techniques required to qualify as an Ecological Planting under this Methodology.

Specified establishment and management techniques for Ecological Plantings

1. Plantings must be established using seedlings or saplings, not direct seeding.
2. Planting density must be between 2,500-4,400 stems/ha (i.e., from 2m x 2m to 1.5m x 1.5m spacing between stems).
3. At least 20 different species of native plants must be planted per hectare.
4. To ensure that a small number of plant species do not numerically dominate the planting, the relative abundance of any single plant species may not be greater than 15% of the total number of stems planted in a Management Unit.
5. Plant species from a mix of successional stages (e.g., pioneer and later successional stages) must be used; pioneer species must not account for more than 30% of stems in a Management Unit.
6. Non-native grasses must be regularly controlled so that cover is kept below 20% in plantings that are less than 15 years old; in sites aged 15 years and older, cover of these grasses must be kept below 1%.
7. The abundance class of other non-native plants must not exceed the following maximum thresholds: in plantings < 15 years old, low impact species must not be Dominant (max. 60% cover) and high impact plants must be no more than Rare (max. 5% cover). In plantings 15 years and older, low impact plants must be no more than Rare (max. 5% cover) and high impact plants must be Absent.

MAXIMUM ABUNDANCE CLASS

	PLANTING AGE	
IMPACT CATEGORY[1]	<15 years	≥15 years
LOW IMPACT SPECIES	Abundant (max. 60% cover)	Rare (max. 5% cover)
HIGH IMPACT SPECIES	Rare (max. 5% cover)	Absent (0% cover)

[1] The classification of non-native plants into low or high impact categories is explained in *Table 4*

6.1.2 Compulsory Field Measurement Years

Indicators of Condition (native tree canopy cover, species richness of native plant recruits and density of medium-large native trees, cover of non-native grass and abundance of non-native plants) must periodically be measured in the field. Scheduled Compulsory Field Measurement Years are: Year 0 before the commencement of any Project Activities (to determine Baseline Condition; Section 3.2.1), then in years 5, 10, 15 and 25 (section 6.1.2). Field Measurements must be taken using the *Field Sampling Protocol for the Measurement of Indicators in Rainforest Replanting* (the Field Sampling Protocol; summarised in Section 6.1.3).

The measured value of each Indicator will be compared with the Target Scores and Threshold Values for that Indicator in that Field Measurement Year (*Table 1*). Field Measurements of canopy cover, species richness of recruits and density of medium-large stems must at least achieve Target Scores in *Table 1*. Field Measurements of the cover of non-native grasses and abundance of other non-native plants must be below the Threshold Values specified in *Table 1*. If values of Indicators in Field Measurements do not meet Target Scores, or if they exceed Threshold Values for non-native grasses and other non-native plants, the Proponent must include a statement in their Monitoring

Report to the Secretariat, prepared by an Approved Operator, explaining why the specified values have not been met and describing actions they will take to ensure they will be met in subsequent Field Measurements. If an Application for Cassowary Credits is submitted with a Monitoring Report that shows Target Scores have not been met or Threshold Values have been exceeded, the application will not be Validated. If Target Scores are not met or Threshold Values are exceeded in two subsequent Monitoring Reports, the Secretariat may apply their Compliance Procedure. If Field Measurements are taken between scheduled Compulsory Field Measurement Years, the table of Target Scores for Indicators (Appendix C) must be used to identify the appropriate value for each Indicator.

Table 1.Target Scores and Threshold Values for Indicators at the Planting Ages of scheduled Compulsory Field Measurement Years. For canopy cover, species richness of recruits and the density of medium-large stems, Target Scores for plantings up to 15 years of age are based on the 80% confidence interval (CI) in the *Models of Target Scores for Indicators* (Model of Target Scores)[22]; for plantings 15 years of age and older, Target Scores are based on the 50% CI. Threshold Values for cover of non-native grasses and abundance of other non-native plants are maximum values and measurements of these Indicators must be below the specified Threshold Values.

	PLANTING AGE				
TARGET SCORES AND THRESHOLD VALUES	0	5	10	15	25
MINIMUM AVERAGE CANOPY COVER (%)	0	30	49	73	83
MINIMUM AVERAGE NO. OF RECRUIT SPECIES	0	2	10	22	29
MINIMUM AVERAGE DENSITY OF STEMS >20 CM DIAMETER	0	9	107	223	294
MAXIMUM AVERAGE COVER OF NON-NATIVE GRASS (%)	N/A	<20% cover		<1%	
MAXIMUM ABUNDANCE OF *LOW-IMPACT* NON-NATIVE PLANTS	N/A	Abundant (max. 60%)		Rare (max. 5%)	
MAXIMUM ABUNDANCE OF *HIGH-IMPACT* NON-NATIVE PLANTS	N/A	Rare (max. 5%)		Absent	

6.1.3 Field Sampling Protocol for the Measurement of Indicators in Rainforest Replanting

Field Measurements must be taken using the specified Field Sampling Protocol. Field Measurements will be taken in 20x50 m (0.1 ha) rectangular Monitoring Plots as set out in the Field Sampling Protocol. Each Monitoring Site comprises two Monitoring Plots so that a total area of 0.2 ha is sampled in each Monitoring Site. Every Management Unit requires at least one Monitoring Site. A higher number of Monitoring Sites is required for larger Management Units, as shown in *Figure 1* and *Table 2*.

.

[22] Models of Target Scores are constructed using measurements from 65 rainforest plantings (Appendix C).

Table 2. Minimum number of Monitoring Sites required for Management Units of different sizes. Each Monitoring Site comprises two, 20x50 m Monitoring Plots.

MANAGEMENT UNIT AREA (HA)	MINIMUM NUMBER OF MONITORING SITES	MINIMUM SAMPLE AREA (HA)
0.2 - 4.4	1	0.2
4.5 - 10	2	0.4
11 - 20	4	0.8
21 - 40	6	1.2
41 - 80	10	2.0
81 +	12	2.4

The location of Monitoring Sites and Monitoring Plots within a Management Unit must be selected by an Approved Operator, in accordance with the Field Sampling Protocol. Monitoring Sites and Monitoring Plots must be located in areas that are representative of the Management Unit.

Monitoring Plots should be distributed across the Management Unit and be separated by at least 20 m. Where a Management Unit comprises multiple separate patches of replanting, Monitoring Plots should be distributed across the different patches (*Figure 1*). Monitoring Plots are set up before Project Activities start to establish Baseline Condition (year 0) and subsequent Field Measurements are taken in the same Monitoring Plots.

Seasonal conditions should be considered when planning Field Measurements, because drought, frost and rainfall can affect the measurements of certain Indicators which in turn can influence whether Target Scores are achieved[23]. Because crediting is based on the Change in Condition over time, sampling should be conducted at similar times of the year or during similar seasonal conditions. *Table 3* shows a summary of the field methods used to measure each of the Indicators.

[23] For example, sampling towards the end of the dry season may show low values of canopy cover because of increased leaf fall.

Table 3. Summary of field methods used to sample each Indicator at a Monitoring Site. One Monitoring Site comprises 2 Monitoring Plots, both 20x50 m. More detail is provided in the *Field Sampling Protocol for the Measurement of Indicators in Rainforest Replanting*.

SITE INDICATOR VALUE	SUMMARY OF FIELD DATA COLLECTION
Average canopy cover of native tree species (%)	• The aim is to obtain the projective foliage cover of native vegetation taller than 2.0 m. • If the vegetation is shorter than 2.0 m, canopy cover is recorded as zero (0) %. • Canopy cover is visually estimated at 6 points in both Monitoring Plots (total of 12 points across the Monitoring Site). The points are located every 10 m, alternating either side of the central transect. At each point, the percentage canopy cover directly above is estimated and a photograph is taken. • The percent of the foliage that consists of non-native species is estimated at each of these same points. This is subtracted to obtain the percentage canopy cover of native trees. • Photos are used in the office to measure canopy cover by counting foliage intersects with a grid overlay. • The value for each point will be the average of the visual and photo measures. • The value for the Monitoring Plot will be the average of the values from the 6 points. • The value for the Monitoring Site will be the average of the values from the 2 Monitoring Plots.
Species richness of native tree, shrub or vine recruits (number different species across both sub-plots i.e., 500 m^2)	• The aim is to record the number of native tree, shrub or vine species 10-100 cm in height that were not planted. • A systematic area search in a 5x50 m sub-plot (250 m^2) is used to count the number of different native tree, shrub and vine species recruiting. The value for the first Monitoring Plot will be the number of different species in the 250 m^2 area. • A systematic area search is conducted in the 2nd Monitoring Plot, but only additional native plant species that were not present in the 1st Monitoring Plot are counted. • The value for the Monitoring Site will be the number of species in the 1st Monitoring Plot plus the number of new species in the 2nd Monitoring Plot.

SITE INDICATOR VALUE	SUMMARY OF FIELD DATA COLLECTION
Density of medium-large diameter stems (per hectare) *Part A. Medium stems 20-50 cm* *The total number of native tree stems 20-50 cm diameter.*	• The aim is to count the number of stems of native tree species that are 20-50 cm in diameter at around 1.3 m above the ground. • A systematic area search in a 10 x 50 m sub-plot (500 m^2) is conducted in both Monitoring Plots. • The value for each Monitoring Plot is the tally of stems 20-50 cm diameter. • The value for the Monitoring Site will be the average of the tallies in both Monitoring Plots. This figure will be multiplied by 20 to convert to a per hectare estimate. • This value will be added to the Monitoring Site value for stems >50 cm diameter (see below) to obtain the Monitoring Site total value for density of medium-large stems (>20 cm diameter).
Density of medium-large diameter stems (per hectare) *Part B. Large stems >50 cm* *The total number of native tree stems >50 cm diameter*	• The aim is to count the number of stems of native tree species that are greater than 50 cm in diameter at around 1.3 m above the ground. • A systematic area search is conducted in the whole 20x50 m Monitoring Plot (1000 m^2). • The value for the Monitoring Plot is the tally of the number of stems >50 cm diameter. • The value for the Monitoring Site will be the average of the tallies in both Monitoring Plots. This figure will be multiplied by 10 to convert to a per hectare estimate. • This value will be added to the Monitoring Site value for stems 20-50 cm diameter (see above) to obtain the Monitoring Site value for medium-large stems (>20 cm diameter).
Average non-native grass cover (%)	• The aim is to determine the percentage of the ground covered by non-native grasses. • Percentage cover is visually estimated in 1x1 m sub-plots at 6 points in both Monitoring Plots, located every 10 m on alternating sides of the central transect. • Native grasses or sedges are not included in cover estimates. • The value for the Monitoring Plot will be the average of the values from the 6 points. • The value for the Monitoring Site will be the average of the values from the 12 points across the 2 Monitoring Plots.

SITE INDICATOR VALUE	SUMMARY OF FIELD DATA COLLECTION
Non-native plant abundance class	• The aim is to determine the abundance class of non-native plants in both high and low impact categories. • A systematic area search of the whole 20x50 m Monitoring Plot (1000 m^2) is used. • Each non-native plant species is assigned to a high or low impact category (see *Table 4* below). • The total abundance of all plants is estimated separately for high and low impact plants (See *Table 5* and refer to the Field Sampling Protocol). • The values for each Monitoring Plot are the abundance estimates for high impact and for low impact plants. • The value for the Monitoring Site is the *highest* abundance estimate from the 2 Monitoring Plots. There will be separate values for high and low impact plants.

Table 4. Characteristics used to classify non-native plants (other than grasses) as high or low impact. *Note* that non-native grasses are considered separately. Approved Operators will have expertise to assign plant species to impact categories. Note that a plant does not need to meet all criteria to be assigned to that category.

LOW IMPACT	HIGH IMPACT
• usually thrives in full sun and therefore is transient in early stages of rainforest restoration or regeneration	• vigorous and fast growing in part-shade or shade and can persist in developed rainforest vegetation
• unlikely to thrive even without management intervention	• likely to thrive without management intervention
• often <2m in height	• can reach heights of over 2m (including by climbing)
• typically occurs in low abundance, isolated and scattered individuals	• can form a dense mat, thickets or smother standing vegetation
• usually does not spread rapidly	• likely to spread rapidly
• fairly easy to control	• difficult to control

Table 5. Cover-abundance classes for non-native plants (other than non-native grasses). Non-native plants must be kept below the Threshold Values for non-native plants in high and low impact categories for the Planting Age (See *Table 1*).

APPROXIMATE COVER	ABUNDANCE CLASS
0	Absent
1-5%	Rare
6-15%	Occasional
16-30%	Common
31-60%	Abundant
61+%	Dominant

6.2 Step 2. Quantify Creditable Condition

Proponents using this Methodology may only claim Credits for the increase in Condition that is Additional to what would have occurred without the Project Activities e.g., through unmanaged Secondary Regrowth or participation in other environmental markets. The Additional Condition that is only attributable to Project Activities is called the Creditable Condition. For each Management Unit, Creditable Condition must be calculated using the *Cassowary Credit Scheme Replanting Additionality Calculator*. This quantifies the improvement in Condition that could have happened due to unmanaged Secondary Regrowth or from participation in another environmental market scheme, even if there were no Cassowary Credit Scheme Project Activities (i.e., the counterfactual scenario).

Creditable Condition is calculated by subtracting the Condition that could have been obtained in the counterfactual scenario from the Condition Score in the Management Unit:

Creditable Condition =

$$\boldsymbol{Conditon\ Score_t - (\ Regrowth\ Condition\ Score_t + \ environmental\ markets\ Condition\ Score_t\ )}$$

Where:
$\boldsymbol{t}$ is the current time.
Condition Score is the measured or modelled Condition Score in a Management Unit.
Regrowth Condition Score is the modelled Condition Score arising from unmanaged Secondary Regrowth at the same Planting Age.
Environmental markets Condition Score is the modelled Condition Score arising from participation in other environmental markets[24] at the same Planting Age.

[24] This model currently only includes participation in the Australian Carbon Credit Unit Scheme using the Environmental or Mallee planting methodology.

The Replanting Additionality Calculator will automatically account for any Condition Score arising from unmanaged Secondary Regrowth for all types of Project[25].

For Projects that are participating in other environmental markets that use change in native woody vegetation cover as a basis for crediting (e.g., an environmental planting methodology in the Australian Carbon Credit Unit Scheme project that), the Replanting Additionality Calculator will use a counterfactual model for participation in other environmental markets based on estimated values of Indicators in Environmental or Mallee plantings[26]. The calculated Condition Scores arising from carbon plantings will be subtracted from the measured or modelled Condition in the Management Unit.

6.3 Step 3. Calculate Change in Condition

The Change in Condition in a Management Unit is the increase in Condition Score that has occurred since the last calculation of Condition Score. The last calculation of Condition Score will either be the previous Monitoring Report or the calculation of Baseline Condition prior to commencement of Project Activities, if there have been no previous Applications made for Cassowary Credits. This way, increases in Condition are only counted once.

Change in Condition is calculated by subtracting the Creditable Condition (Section 6.2) calculated for the previous Monitoring Report from the Creditable Condition at the current time, i.e.,

$$\textbf{Change in Condition}_t = \boldsymbol{Creditable\ Condition}_{\ t} - \boldsymbol{Creditable\ Condition}_{\ t-1}$$

Where:
t is the current time
t-1 is the time of the previous Monitoring Report or the time Baseline Condition was measured.

6.4 Step 4: Calculate Condition Improvement Units (CIUs)

Condition Improvement Units (CIUs) are calculated based on the Change in Condition and the extent of the Management Unit, i.e.,

$$\textbf{Condition Improvement Units (CIUs)}_t = \boldsymbol{Change\ in\ Condition}_t * \boldsymbol{size\ of\ Management\ Unit}\ (\boldsymbol{ha})$$

Where t is the current time

[25] The currently used counterfactual model for unmanaged Secondary Regrowth quantifies zero increase in Condition attributable to regrowth over the 25-year Crediting Period. This is based on measurements of Indicators in unmanaged rainforest regrowth in the Wet Tropics Bioregion and includes a time-lag to account for the delayed commencement of regrowth due to persistent, non-native grasses. Refer to the *Explanatory Statement for the Replanting Methodology in the Cassowary Credit Scheme*. Future versions of the Methodology may include a different counterfactual model if new data become available.

[26] Based on the requirements of the Environmental or Mallee planting methodology in the Australian Carbon Credit Unit Scheme. To satisfy the requirements of the Environmental or Mallee planting methodology, plantings need to achieve at least 20% canopy cover. There is no explicit requirement for density of large stems, though this is implied in the calculation of carbon sequestration using FullCAM equations. There is no requirement relating to native recruitment. Refer to the *Explanatory Statement for the Replanting Methodology in the Cassowary Credit Scheme*. Future versions of the Methodology may include other environmental market schemes if data become available.

7. Project Reporting

Project reporting is the mechanism by which the Secretariat will ensure that Projects are implemented, identify risks and keep track of project outcomes. It will also be the basis for issuing Cassowary Credits. Project reporting is described in Section 3.2 and includes:

a) Reporting Baseline Condition and Notification of Commencement of Project Activities
b) Notification of Planting Date
c) Notification of Protection
d) Annual Report
e) Monitoring Report
f) Notification of Reversal.

Reports must be submitted by the Proponent to the Secretariat as outlined in Section 3.2.

8. Verification

Project Proponents must meet the Verification requirements outlined in the Standard, including the schedule and inclusions.

Where Verification is required, it must be conducted by an Approved Verifier.

9. Issuance of Cassowary Credits

9.1 Minimum and Maximum Planting Ages

Application for Cassowary Credits may not be made less than two years from the Planting Date (i.e., when Planting Age is less than 2 years). Application for Cassowary Credits may only be made within the 25-year Crediting Period, unless the Secretariat has approved an extension to the Crediting Period.

9.2 Calculation of Cassowary Credits

Calculation of the number of Cassowary Credits to be issued for a Project will be based on the number of CIUs calculated for a Management Unit (Section 6.4), multiplied by the Conversion Factor[27]. There are two Conversion Factors used this Methodology (*Table 6*).

If a Proponent has a Notification of Protection that has been Validated by the Secretariat, the Proponent will be eligible to apply a higher Conversion Factor (20% higher than the standard Conversion Factor) in their calculation of Cassowary Credits for that proportion of the Project Area that is protected. The higher Conversion Factor can be used in any Applications for Cassowary Credits submitted after the Validation date of the Notification of Protection.

Proponents must use the correct Conversion Factor in their Calculation of Cassowary Credits.

[27] The Conversion Factor is a number used as a multiplier to convert the quantified and Verified benefit to rainforest biodiversity from a Project to Cassowary Credits, resulting in a relative value of credits that reflects how they were generated and what outcomes they represent.

Table 6. Conversion Factors used in this Methodology

	CONVERSION FACTOR
Projects that have a Validated Notification of Protection over the entire Project Area.	12
Projects that do not have a Validated Notification of Protection over any part of the Project Area.	10
Projects that have a Validated Notification of Protection over part of the Project Area:	
I) For the proportion of the Project Area that is protected.	12
II) For the proportion of the Project Area that is not protected.	10

Cassowary Credits$_t$ = $\boldsymbol{Condition\ Improvement\ Units_t * Conversion\ Factor}$

Where:

t is the current time
Conversion Factor see *Table 6*.

9.3 Deductions

Applicable deductions must be subtracted from calculations of Cassowary Credits. These include:

i. Five percent (5%) Risk of Reversal Buffer, in accordance with the Cassowary Credit Scheme Standard; and
ii. Five percent (5%) Withholding Credits, which will be retained by the Secretariat until the end of the Crediting Period. Upon Validation of the final Monitoring Report showing 25-year Target Scores have been met and 25-year Threshold Values have not been exceeded, these Withholding Credits will be released by the Secretariat to the Proponent's Registry Account.

9.4 Application for Cassowary Credits

An Application for Cassowary Credits must be prepared by an Approved Operator and report the Condition Improvement Units (CIU) for each Management Unit. If a Proponent applies for the issuance of Cassowary Credits from multiple Management Units at one time, the CIU for all of those Management Units will be added together to calculate the total number of CIU credited to the Methodology Area at that time. This can include CIU that have been calculated previously, as long as they have not already been used in any calculations of Cassowary Credits.

Proponents can submit an Application for Cassowary Credits accompanied by a Monitoring Report and Validated Annual Report(s) for the period for which Credits are being claimed, at any time after the planting is two years old. Validation of the Application for Cassowary Credits is subject to Validation of the Monitoring Report. If the higher Conversion Factor (*Table 6*) is used in the calculation of Cassowary Credits, the Proponent must also have a Validated Notification of Protection. For Projects that do not use Ecological Planting techniques as defined in this Methodology, the CIU reported in the Monitoring Report and used in the Application for Cassowary Credits must always be based on Field Measurements. For Ecological Plantings, the CIU reported in the Monitoring Report and used in the Application for Cassowary Credits may be based on either the Model of Expected Condition or Field

Measurements[28]. If the application occurs in a Compulsory Field Measurement Year[29], calculation of CIU must be based on Field Measurements and reported in a Monitoring Report, even in Ecological Plantings. Where Field Measurements are required, they must show that canopy cover, species richness of recruits and density of medium-large stems have achieved the Target Scores and that non-native grass cover and abundance of other non-native plants do not exceed the Threshold Values specified for the Planting Age (*Table 1* and Appendix C.).

[28] Proponents may elect to use Field Measurements if substantially higher Indicator values have been achieved than predicted from the Model of Expected Condition.

[29] Compulsory Field Measurement Years are the 12-month period starting on the 5th, 10th, 15th and 25th anniversary of the Planting Date for the Management Unit, in addition to the Baseline Condition Field Measurement required before commencement of Project Activities (i.e., Year 0).

Appendices

Appendix A. Reference Benchmark values for Indicators of Condition

Reference Benchmark values are the mean value for each Indicator sampled across 16 forest sites. Information about sites, data collection methods and handling is presented in Kanowski *et al.* (2003)[30].

INDICATOR	MEAN VALUE IN FOREST	STANDARD ERROR
Canopy cover (%)	83	1.4
Species richness of native recruits in 500 m^2	55	3.0
Density of medium-large stems in 1 ha	333	19.9

[30] Kanowski J., Catterall C. P., Wardell-Johnson G. W., Proctor H. and Reis T. (2003) Development of forest structure on cleared rainforest land in eastern Australia under different styles of reforestation. Forest Ecology and Management 183: 265-280.

Appendix B. Table of expected Condition Scores at different Planting Ages

Expected Condition Scores in Ecological Plantings. Based on model description 27.132*ln(age)-2.338 (R^2=0.90)

PLANTING AGE	EXPECTED CONDITION SCORE
1	N/A
2	16
3	27
4	35
5	41
6	46
7	50
8	54
9	57
10	60
11	63
12	65
13	67
14	69
15	71
16	73
17	75
18	76
19	78
20	79
21	80
22	82
23	83
24	84
25	85

Appendix C. Table of Target Scores for Indicators at given Planting Age

Values are calculated from models based on field measurements in 65 different Ecological Plantings of varying ages. Values are based on exceeding the 80% confidence interval for Planting Ages 0-14; and the 50% confidence interval for Planting Ages 15-25.

PLANTING AGE	MINIMUM CANOPY COVER (%)	MINIMUM SPECIES RICHNESS OF RECRUITS (IN 500 M^2)	MINIMUM DENSITY OF LARGE STEMS (IN 1 HA)
1	3	0	0
2	10	0	0
3	18	0	0
4	24	0	0
5	30	2	9
6	35	4	35
7	39	6	57
8	43	8	76
9	46	9	93
10	49	10	107
11	51	11	121
12	54	12	133
13	56	13	144
14	58	14	155
15	73	22	223
16	74	23	232
17	75	24	240
18	77	25	248
19	78	25	256
20	79	26	263
21	80	26	270
22	81	27	277
23	81	28	283
24	82	28	289
25	83	29	294