



# BIOCARBON TOOL

## LEAKAGE MANAGEMENT

**BCR carbon credits are issued subject to structured leakage risk management, monitoring, and conservative deduction of material displacement emissions**

**BIOCARBON CERT<sup>®</sup>**

VERSION 1.0 | February 12, 2026

BIOCARBON CERT

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## Table of contents

<b>1</b>	<b>INTRODUCTION</b> .....	<b>5</b>
<b>2</b>	<b>PURPOSE</b> .....	<b>5</b>
<b>3</b>	<b>OBJECTIVES</b> .....	<b>6</b>
<b>4</b>	<b>VERSION</b> .....	<b>7</b>
<b>5</b>	<b>GENERAL TERMS</b> .....	<b>7</b>
<b>6</b>	<b>NORMATIVE REFERENCES</b> .....	<b>7</b>
6.1	BIOCARBON STANDARD DOCUMENTS (NORMATIVE) .....	7
6.2	INTERNATIONAL STANDARDS AND TECHNICAL GUIDANCE .....	8
<b>7</b>	<b>SCOPE</b> .....	<b>8</b>
<b>8</b>	<b>SECTORAL COVERAGE AND LEAKAGE RELEVANCE</b> .....	<b>9</b>
<b>9</b>	<b>LEAKAGE IDENTIFICATION AND ASSESSMENT</b> .....	<b>11</b>
9.1	GENERAL REQUIREMENT .....	11
9.2	CONFIRMATION OF PROJECT BOUNDARY .....	11
9.3	IDENTIFICATION OF POTENTIAL LEAKAGE SOURCES .....	11
9.4	PRELIMINARY ASSESSMENT OF LEAKAGE RISK .....	12
9.5	DETERMINATION OF MATERIALITY.....	12
9.6	DOCUMENTATION REQUIREMENTS .....	13
<b>10</b>	<b>RISK-SCALED HYBRID LEAKAGE FRAMEWORK</b> .....	<b>13</b>
10.1	GENERAL PRINCIPLE.....	13
10.2	RISK CLASSIFICATION LEVELS .....	14
10.3	PROPORTIONALITY SAFEGUARD .....	15
10.4	ACCOUNTING TREATMENT OF LEAKAGE .....	15
<b>11</b>	<b>QUANTIFICATION OF LEAKAGE</b> .....	<b>16</b>
11.1	GENERAL QUANTIFICATION PRINCIPLES .....	16
11.2	QUANTIFICATION OF MEASURABLE LEAKAGE .....	17
11.3	CONSERVATIVE ADJUSTMENT APPROACHES (NON-QUANTIFIABLE LEAKAGE) .....	18

11.4	MONITORING REQUIREMENTS FOR QUANTIFIED LEAKAGE .....	18
<b>12</b>	<b>VALIDATION AND VERIFICATION CONSIDERATIONS .....</b>	<b>19</b>
12.1	VALIDATION REVIEW .....	19
12.2	VERIFICATION REVIEW .....	19
<b>13</b>	<b>REVIEW AND REASSESSMENT OF LEAKAGE .....</b>	<b>20</b>
13.1	CIRCUMSTANCES REQUIRING REASSESSMENT .....	20
13.2	PERIODIC REASSESSMENT .....	20
13.3	METHODOLOGICAL CONSISTENCY .....	20
<b>14</b>	<b>DOCUMENTATION, TRANSPARENCY AND RECORD-KEEPING .....</b>	<b>21</b>
<b>15</b>	<b>DOCUMENT STATUS AND APPLICABILITY .....</b>	<b>21</b>

## 1 Introduction

The Leakage Management Tool forms an integral component of the BioCarbon Standard. It establishes the mandatory framework for the identification, assessment, quantification and management of leakage associated with mitigation and removal activities implemented under the Program.

Leakage refers to any increase in greenhouse gas (GHG) emissions occurring outside the defined project boundary that is attributable to the implementation of an activity and that may reduce the net climate benefit achieved. If not properly identified and addressed, leakage may lead to over-crediting and compromise environmental integrity.

This Tool defines the minimum procedural, methodological and documentation requirements that shall be applied to ensure that all material leakage risks are systematically identified at the design stage, evaluated using predefined materiality criteria, quantified where measurable, and conservatively treated where uncertainty or indirect displacement effects exist.

Leakage management under this Tool follows a risk-scaled hybrid framework combining quantitative accounting and structured risk assessment. All activities shall undergo mandatory leakage identification and assessment. Measurable leakage shall be quantified using conservative methods, while non-measurable leakage shall be evaluated through structured risk analysis. The depth of analysis, quantification requirements and monitoring obligations shall be proportionate to the scale, sectoral characteristics and materiality of the identified leakage risk.

Leakage deductions shall directly affect the calculation of net emission reductions. Leakage shall not be addressed through permanence buffers or uncertainty adjustments unless explicitly required by an approved methodology.

The provisions of this Tool are intended to ensure that issued BCR carbon credits represent real, additional and net emission reductions, and that displacement effects are transparently and conservatively managed across all applicable sectors.

## 2 Purpose

The purpose of this Tool is to safeguard the environmental integrity of emission reductions issued under the BioCarbon Standard by ensuring that displacement effects do not undermine the net climate benefit of mitigation and removal activities.

Leakage, if not properly identified and conservatively addressed, may result in inflated emission reduction claims and compromise the credibility of issued units. This Tool therefore establishes a structured framework to ensure that all material leakage risks are transparently assessed and appropriately treated.

By combining quantitative accounting with risk-based evaluation and applying proportionality based on materiality, this Tool ensures that leakage management remains rigorous while avoiding unnecessary regulatory burden for low-risk or small-scale activities.

Through these provisions, the Tool contributes to preventing over-crediting, maintaining consistency across sectors, and reinforcing confidence in the integrity of BCR carbon credits.

### 3 Objectives

The objective of this Tool is to establish a structured, conservative and proportionate framework for the management of leakage under the BioCarbon Standard.

Specifically, this Tool aims to:

- (a) Ensure systematic identification of potential leakage sources associated with mitigation and removal activities;
- (b) Establish clear criteria for determining the materiality of identified leakage risks;
- (c) Define when leakage shall be quantified and how it shall be incorporated into net emission reduction calculations;
- (d) Establish structured procedures for risk-based evaluation where direct quantification is not feasible;
- (e) Require conservative treatment of material leakage risks in order to prevent over-crediting;
- (f) Ensure proportionality by scaling assessment and monitoring requirements to the magnitude and risk profile of the activity; and
- (g) Provide consistent rules applicable across sectors while allowing for methodological differentiation where justified.

Through these objectives, the Tool safeguards environmental integrity and ensures that issued BCR carbon credits reflect real, additional and net emission reductions after accounting for displacement effects.

## 4 Version

This document constitutes Version 1.0 of the Leakage Management Tool under the BioCarbon Standard.

Version 1.0 was adopted on February 12, 2026, and shall apply to all activities submitted for validation on or after its effective date.

Subsequent revisions, if any, shall be formally issued, version-controlled, and publicly made available. Amendments may be adopted to reflect methodological improvements, regulatory alignment, clarification of requirements, or operational enhancements.

New versions shall not have retroactive effect unless explicitly stated. Where future revisions introduce substantive changes, transitional provisions shall be defined to ensure regulatory certainty, consistency in application, and protection of legitimate expectations.

In the event of inconsistency between this Tool and an approved methodology, the requirements of the approved methodology shall prevail, provided that such provisions do not undermine the environmental integrity principles established under the BioCarbon Standard.

## 5 General terms

The following general terms apply for this Tool:

- (a) "Shall" is used to indicate that the requirement shall be met;
- (b) "Should" is used to suggest that, among several possibilities, a course of action recommended as particularly appropriate;
- (c) "May" is used to indicate that it is permitted.

## 6 Normative references

The following documents are referenced in this Tool. Where provisions of the BioCarbon Standard documents are cited, they constitute normative requirements. International standards and technical guidance are referenced to ensure methodological consistency and alignment with recognized best practices.

### 6.1 BioCarbon Standard documents (normative)

- (a) BCR Standard (current version in force).

- (b) Validation and verification manual (current version in force).
- (c) Standard operating procedures (SOP).
- (d) Additionality Tool.
- (e) Uncertainty Tool.
- (f) Risk Tool.
- (g) Approved sectoral methodologies under the BioCarbon Standard.

For undated references, the latest version in force shall apply.

## **6.2 International standards and technical guidance**

- (a) IPCC, 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- (b) IPCC, 2019. 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- (c) ISO 14064-2:2019, Greenhouse gases – Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.
- (d) ISO 14064-3:2019, Greenhouse gases – Part 3: Specification with guidance for the verification and validation of greenhouse gas statements.

International standards referenced above provide technical guidance and methodological consistency. In the event of conflict, the provisions of the BioCarbon Standard shall prevail.

## **7 Scope**

This Tool applies to all mitigation and removal activities seeking issuance of BCR carbon credits under the BioCarbon Standard.

It establishes the requirements for:

- (a) Ex-ante identification and assessment of potential leakage during validation;
- (b) Determination of materiality based on predefined criteria;
- (c) Quantification of measurable leakage and its integration into net emission reduction calculations;
- (d) Structured risk-based assessment where direct quantification is not feasible;
- (e) Application of conservative adjustments where material leakage risk is identified;
- and
- (f) Ex-post monitoring and verification of leakage, where applicable.

Leakage shall be assessed for each crediting period and shall be deducted from baseline emission reductions where determined to be material.

The level of analysis required under this Tool shall be proportionate to:

- (a) The scale of the activity;
- (b) The sectoral characteristics;
- (c) The likelihood of displacement effects; and
- (d) The potential magnitude of associated emissions.

All activities shall undergo mandatory leakage identification and assessment. Where leakage identification and assessment demonstrate negligible or low risk, simplified assessment procedures may be applied, provided that justification is transparently documented. Where moderate or high risk is identified, enhanced assessment, quantification and monitoring requirements shall apply in accordance with the risk-scaled framework defined in this Tool.

This Tool applies across all eligible sectors, including but not limited to:

- (a) AFOLU activities;
- (b) Energy and industrial mitigation activities;
- (c) Waste and circular economy activities; and
- (d) Other mitigation or removal sectors approved under the BioCarbon Standard.

Failure to identify and conservatively address material leakage risk shall render the corresponding emission reductions ineligible for issuance.

## **8 Sectoral coverage and leakage relevance**

Leakage risk varies significantly across sectors, activity types and scales. While this Tool applies to all activities eligible under the BioCarbon Standard, the nature, likelihood and magnitude of leakage may differ depending on the economic, land-use and market dynamics associated with each sector.

For the purpose of structured and proportionate implementation, activities shall be initially categorized according to their typical sectoral leakage profile. This categorization serves as indicative guidance for leakage identification and does not replace project-specific assessment.

The table below provides a non-exhaustive overview of common sectoral leakage characteristics.

Table 1. Sectoral leakage characteristics

Sector / Activity Type	Typical Leakage Risk Profile	Common Leakage Mechanisms
Avoided deforestation (REDD+)	High	Activity shifting, timber market displacement, agricultural expansion
Afforestation / Reforestation (ARR)	Moderate	Land-use competition, agricultural displacement
Improved forest management (IFM)	Moderate	Timber supply response, harvesting displacement
Ecosystem restoration (non-commercial)	Low–Moderate	Local land-use substitution
Renewable energy generation	Negligible–Low	Electricity market displacement
Energy efficiency	Low	Rebound effect
Waste management and biomethanisation	Low	Upstream or downstream material displacement

Sectoral categorization shall not predetermine final leakage classification. All activities shall undergo project-specific identification and assessment in accordance with Section 9 of this Tool.

Where sectoral characteristics indicate structurally low or negligible leakage risk, simplified assessment procedures may be applied, provided that such determination is supported by documented justification.

Where sectoral characteristics indicate moderate or high structural leakage risk, enhanced assessment and, where applicable, quantification requirements shall apply in accordance with the risk-scaled hybrid framework established in this Tool.

Sector-specific leakage treatment requirements shall be further detailed in approved methodologies under the BioCarbon Standard.

## **9 Leakage identification and assessment**

### **9.1 General requirement**

All activities seeking issuance of BCR carbon credits under the BioCarbon Standard shall conduct a leakage identification and assessment at the validation stage.

The purpose of this assessment is to:

- (a) Identify all potential sources of leakage attributable to the activity;
- (b) Evaluate whether such leakage may be material; and
- (c) Establish the level of treatment required under the risk-scaled hybrid framework defined in Section 10.

Leakage identification and assessment shall be documented in the Project Document and shall be subject to validation and verification.

### **9.2 Confirmation of project boundary**

The project boundary shall be clearly defined in accordance with the applicable methodology.

The project holders shall assess whether implementation of the activity may cause emissions increases outside the defined boundary due to:

- (a) Displacement of activities;
- (b) Market effects;
- (c) Supply-chain adjustments; or
- (d) Indirect behavioral responses.

### **9.3 Identification of potential leakage sources**

The project holders shall identify all plausible sources of emissions increases outside the defined project boundary that may occur as a consequence of the activity.

Identification shall include, where relevant:

- (a) Activity-shifting effects (e.g., relocation of land-use or production activities);
- (b) Market effects (e.g., supply-demand responses influencing emissions elsewhere);
- (c) Upstream and downstream effects;
- (d) Rebound effects;
- (e) Ecological displacement mechanisms where applicable;
- (f) Other indirect displacement mechanisms relevant to the sector.

The identification process shall consider:

- (a) Sectoral characteristics described in Section 8;
- (b) Geographic and socio-economic context;
- (c) Scale of the activity; and
- (d) Reasonably foreseeable behavioral responses.

All identified sources shall be listed and justified.

#### **9.4 Preliminary assessment of leakage risk**

For each identified leakage source, the project holders shall conduct a preliminary assessment evaluating likelihood of occurrence and potential magnitude of associated emissions.

The assessment shall be based on available data, sectoral evidence, conservative assumptions and reasonable justification.

Qualitative reasoning may be applied at this stage, provided that conclusions are transparently supported.

#### **9.5 Determination of materiality**

Leakage shall be considered material where there is reasonable potential for emissions increases outside the project boundary that could significantly affect net emission reductions.

Materiality shall be determined considering:

- (a) The estimated magnitude of potential displaced emissions;
- (b) The proportion relative to baseline emission reductions;
- (c) The duration and persistence of displacement effects; and
- (d) Structural market or land-use sensitivity.

For the purpose of quantitative materiality determination, leakage shall generally be considered material where estimated leakage emissions are likely to equal or exceed 5% of baseline emission reductions ( $BE_y - PE_y$ ) for the relevant monitoring period.

Where estimated leakage emissions are between 2% and 5% of baseline emission reductions, enhanced assessment and conservative justification shall be required.

Leakage estimated below 2% of baseline emission reductions may be considered immaterial, provided that the assessment is transparently documented and subject to validation.

Where leakage risk is determined to be negligible or demonstrably immaterial, no further quantification shall be required, provided that justification is transparently documented.

Where leakage risk is potentially material, the activity shall proceed to enhanced assessment and, where feasible, quantification in accordance with Sections 10 and 11 of this Tool.

Conformity Assessment Bodies (CAB) shall explicitly assess the adequacy of materiality determination and document their conclusion in the validation and verification report.

## **9.6 Documentation requirements**

The leakage identification and assessment shall include:

- (a) Description of all identified leakage sources;
- (b) Rationale for inclusion or exclusion;
- (c) Assumptions applied;
- (d) Data sources used; and
- (e) Conclusion regarding risk classification.

Failure by the project holders to adequately identify and assess material leakage risk shall constitute a non-conformity during validation or verification.

# **10 Risk-scaled hybrid leakage framework**

## **10.1 General principle**

Leakage management under the BioCarbon Standard follows a risk-scaled hybrid framework combining quantitative accounting and structured risk evaluation.

All activities shall undergo leakage identification and assessment in accordance with Section 9. The level of treatment required shall be proportionate to the materiality of the identified leakage risk.

Leakage shall be:

- (a) Quantified where measurable and material;
- (b) Conservatively adjusted where material but not directly quantifiable; and
- (c) Documented and justified where determined to be negligible or immaterial.

The purpose of this framework is to ensure environmental integrity while avoiding unnecessary regulatory burden for low-risk or small-scale activities.

### 10.2 Risk classification levels

Based on the leakage identification and assessment, the project holders shall classify each identified leakage source according to the following risk levels.

Table 2. Leakage risk classification and corresponding requirements

Risk level	Conditions required	Requirements
Level 1 – Negligible risk	<p>There is no plausible displacement mechanism; or</p> <p>Available evidence demonstrates absence of causal linkage; or</p> <p>The potential emissions increase is demonstrably insignificant.</p>	<p>Documentation of justification;</p> <p>No quantification required;</p> <p>No specific monitoring required.</p>
Level 2 – Low risk	<p>A displacement mechanism is plausible; but</p> <p>The expected magnitude is minor; and</p> <p>Structural or contextual factors limit the scale of emissions increase.</p>	<p>Qualitative assessment;</p> <p>Quantification not mandatory unless further evidence indicates materiality;</p> <p>Simplified monitoring where relevant;</p> <p>Conservative reasoning documented.</p>
Level 3 – Moderate risk	<p>A displacement mechanism is plausible and supported by contextual evidence; and</p> <p>The potential magnitude may materially affect net emission reductions.</p>	<p>Enhanced assessment;</p> <p>Quantification required where feasible;</p> <p>Conservative assumptions applied;</p>

		<p>Monitoring of relevant parameters required;</p> <p>Deduction of quantified leakage from emission reductions.</p> <p>Note: Where quantification is not feasible, conservative adjustment factors shall be applied.</p>
Level 4 – High risk	<p>Strong evidence exists of likely displacement; and</p> <p>The potential emissions increase could significantly affect the integrity of credited reductions.</p>	<p>Full quantification mandatory;</p> <p>Detailed monitoring mandatory;</p> <p>Conservative emission factors required;</p> <p>Explicit deduction from net emission reductions.</p>

Note: Where material leakage cannot be adequately quantified or conservatively managed, the activity may be deemed ineligible for credit issuance.

### 10.3 Proportionality safeguard

The application of this framework shall ensure proportionality. Requirements shall scale according to:

- (a) Activity size;
- (b) Sectoral characteristics;
- (c) Geographic context; and
- (d) Magnitude of expected displacement.

Low-risk and small-scale activities shall not be subject to disproportionate analytical burden, provided environmental integrity is not compromised.

### 10.4 Accounting treatment of leakage

Leakage shall be treated as an accounting adjustment to emission reductions.

Where leakage is determined to be material, it shall be deducted from baseline emission reductions in the calculation of net emission reductions for the relevant monitoring period.

Leakage accounting shall:

- (a) Reflect quantified leakage emissions where measurement is feasible;
- (b) Apply conservative adjustment approaches where quantification is not feasible but material risk exists;
- (c) Be transparently documented in the Project Document and monitoring reports; and
- (d) Be subject to validation and verification.

Leakage shall be accounted for separately from uncertainty management and permanence risk provisions. It shall not be addressed through buffer mechanisms or risk pools unless explicitly required by an approved methodology.

The detailed procedures and calculation requirements for leakage quantification are set out in Section 11 of this Tool.

## **11 Quantification of leakage**

### **11.1 General quantification principles**

Leakage shall be quantified where:

- (a) A leakage source has been identified in accordance with Section 9;
- (b) The leakage risk has been determined to be material; and
- (c) Quantification is technically feasible using available data and reasonable methodological approaches.

Quantification shall be conducted in a conservative, transparent and reproducible manner, consistent with the applicable methodology and the accounting principles of the BioCarbon Standard.

Approved methodologies under the BioCarbon Standard may establish sector-specific procedures for leakage identification, quantification and monitoring. Where methodology-specific provisions exist, such provisions shall apply in addition to, and in consistency with, the general principles established in this Tool. In the event of inconsistency, the provisions of the approved methodology shall prevail, provided that such provisions meet or exceed the environmental integrity requirements established under this Tool.

Where project-specific data are available, they shall be used. Where project-specific data are not available, conservative emission factors, default values or proxy indicators may be applied, provided that their selection is justified and transparently documented.

Where leakage risk is determined to be material but direct quantification is not technically feasible, conservative adjustment approaches shall be applied in accordance with Section 11.3.

Emission reductions shall not be issued where material leakage has not been adequately quantified or conservatively adjusted.

### **11.2 Quantification of measurable leakage**

Where leakage is determined to be material and quantification is technically feasible, project holders shall quantify leakage emissions for each monitoring period.

The specific calculation procedures, equations, parameters and emission factors shall be defined in the applicable approved methodology.

Quantification shall be based on one or more of the following approaches, as applicable to the sector and activity type:

- (a) Measurement of displaced activity levels combined with appropriate emission factors;
- (b) Application of activity data multiplied by conservative emission factors;
- (c) Spatial analysis of land-use change supported by geospatial data;
- (d) Market-based estimation supported by documented production, trade or consumption data;
- (e) Other methodology-specific procedures approved under the BioCarbon Standard.

Quantification shall:

- (a) Be consistent with the defined project boundary and baseline scenario;
- (b) Ensure consistency with defined baseline and project emission accounting boundaries and prevent double counting of emission sources;
- (c) Apply conservative assumptions where uncertainty exists;
- (d) Use project-specific data where available;
- (e) Clearly define all parameters, units and emission factors used.

Where proxy data or default values are applied, their selection shall be justified and documented.

Leakage emissions shall be calculated for each monitoring period and incorporated into the emission reduction calculation in accordance with Section 10.4.

### **11.3 Conservative adjustment approaches (non-quantifiable leakage)**

Where leakage risk is determined to be material but direct quantification is not technically feasible, project holders shall apply conservative adjustment measures.

Such measures may include:

- (a) Application of standardized leakage rates established in approved methodologies;
- (b) Application of predefined conservative discount factors;
- (c) Use of upper-bound emission factor assumptions;
- (d) Restriction of credited volume to ensure conservativeness.

The chosen approach shall ensure that emission reductions are not overstated.

Justification for the applied adjustment shall be documented and subject to validation and verification.

### **11.4 Monitoring requirements for quantified leakage**

Where leakage emissions are quantified or conservatively adjusted, project holders shall incorporate specific leakage monitoring provisions into the monitoring plan.

Monitoring shall be proportionate to the level of leakage risk identified under Section 10 and consistent with the applicable methodology.

Monitoring requirements shall include, as applicable:

- (a) Identification of parameters relevant to each quantified leakage source;
- (b) Definition of data collection methods and measurement procedures;
- (c) Frequency of data collection and reporting;
- (d) Data quality control and quality assurance procedures;
- (e) Procedures for handling missing or incomplete data;
- (f) Roles and responsibilities for data collection and management;
- (g) Record-keeping and traceability requirements.

Where conservative adjustment factors are applied in lieu of direct quantification, monitoring shall ensure that the underlying assumptions remain valid throughout the monitoring period.

If material changes occur in activity scale, geographic context, market conditions or other relevant factors that may affect leakage risk, project holders shall reassess leakage in accordance with Section 9.

Leakage monitoring results shall be transparently reported in the monitoring report and shall be subject to validation and verification.

## **12 Validation and verification considerations**

### **12.1 Validation review**

During validation, CAB shall assess the adequacy of the leakage identification and assessment conducted under Section 9.

Validation bodies shall:

- (a) Confirm that all plausible leakage sources have been identified;
- (b) Evaluate the justification for inclusion or exclusion of identified leakage sources;
- (c) Review the materiality determination, including any quantitative thresholds applied;
- (d) Assess whether the selected risk classification level is justified;
- (e) Confirm that proposed quantification or conservative adjustment approaches are consistent with this Tool and the applicable methodology.

Where leakage is determined to be immaterial, validation bodies shall explicitly assess the supporting evidence and document their conclusion.

### **12.2 Verification review**

During verification, CAB shall assess whether leakage has been:

- (a) Quantified in accordance with Section 11 where required;
- (b) Conservatively adjusted where quantification was not feasible;
- (c) Correctly incorporated into net emission reduction calculations;
- (d) Monitored in accordance with the monitoring plan.

CAB shall review:

- (a) Data sources used for leakage quantification;
- (b) Applied emission factors and assumptions;
- (c) Consistency with baseline and project emission accounting boundaries;
- (d) Circumstances requiring reassessment where relevant.

The validation and verification report shall explicitly state the conclusions regarding leakage management and materiality determination.

Failure to adequately identify, quantify or conservatively adjust material leakage shall constitute a non-conformity.

## **13 Review and reassessment of leakage**

### **13.1 Circumstances requiring reassessment**

Leakage shall be reassessed where material changes occur that may affect previously identified leakage sources, risk classification or quantification results.

Reassessment shall be required where:

- (a) The scale or scope of the activity changes materially;
- (b) The project boundary is modified;
- (c) Significant changes occur in market conditions relevant to displacement risk;
- (d) Land-use dynamics or regulatory frameworks change in a manner that may influence leakage;
- (e) Monitoring data indicate divergence from expected displacement patterns;
- (f) Methodological updates require reassessment.

Project holders shall document any reassessment and its implications for leakage quantification or adjustment.

### **13.2 Periodic reassessment**

In addition to reassessment required under the circumstances described in Section 13.1, leakage risk shall be reviewed at each verification event to confirm that previously established materiality determinations remain valid.

Where previously immaterial leakage becomes material due to changing conditions, quantification or conservative adjustment shall be applied from the relevant monitoring period onward.

### **13.3 Methodological consistency**

Reassessment shall maintain consistency with:

- (a) The applicable approved methodology;
- (b) The accounting principles established in this Tool;
- (c) The materiality thresholds defined in Section 9.

Changes in leakage classification or quantification approach shall be transparently documented and justified in the monitoring report.

## **14 Documentation, transparency and record-keeping**

Project holders shall maintain documentation sufficient to demonstrate compliance with all leakage identification, assessment, quantification and adjustment requirements.

Documentation shall include:

- (a) Identification of leakage sources;
- (b) Materiality determination;
- (c) Quantification methods and assumptions;
- (d) Applied conservative adjustments;
- (e) Monitoring data and calculation spreadsheets;
- (f) Reassessment documentation where applicable.

All documentation shall be retained in accordance with the document retention requirements of the BioCarbon Standard.

Leakage accounting shall be traceable from raw data to final emission reduction calculations. All intermediate calculation steps shall be reproducible.

## **15 Document status and applicability**

This Tool constitutes a normative instrument under the BioCarbon Standard and shall be applied in conjunction with approved methodologies and related Program documents.

This Tool enters into force on the effective date specified in Section 4 and applies to all activities submitted for validation thereafter, unless otherwise specified in transitional provisions.

This document shall be publicly available and version-controlled.

*History of document*

**Type of document**

**BioCarbon Tool Leakage Management**

<b>Version</b>	<b>Date</b>	<b>Description</b>
Version 1.0	February 12, 2026	Initial issuance establishing mandatory leakage management requirements under the BioCarbon Standard.