METHODS FOR MONITORING GREENHOUSE GAS EMISSIONS WITHIN THE PROJECT AREA AND LEAKAGE BELT FROM UNPLANNED DEFORESTATION (MON-AUD)

Document Prepared by Climate Focus

Title	Methods for monitoring greenhouse gas emissions within the Project Boundary and Leakage Belt from unplanned deforestation (MON-AUD)
Version	1.0
Date of Issue	30 March 2022
Type	Module
Sectoral Scope	14. Agriculture Forestry and Other Land Use (AFOLU)
Prepared By	Climate Focus
Contact	Verra: Manuel Estrada, Director, REDD+ Technical Innovation, mestrada@verra.org

CONTENTS

1 SOURCES

This module uses the latest version of the Modules:

- J-ADB-UD Module - Determination of Jurisdictional Activity Data Baseline for Unplanned Deforestation
- BL-UD Module - Estimation of Baseline greenhouse gas emissions within the Project Area and Leakage Belt from unplanned deforestation
- LK-UD-AS Module - Estimation of emissions from activity shifting for avoiding unplanned deforestation

Other relevant sources employed by this Module shall be listed in the relevant VCS Methodology.

2 SUMMARY DESCRIPTION OF THE MODULE

This module provides methods for monitoring *ex-post* emissions of GHGs that have taken place due to deforestation within the AUD, combined AUD-AUWD or combined AUD-RWE Project Area and Leakage Belt during the Monitoring Period. Hereinafter, when referring to "AUD", "combined AUD-AUWD" or "combined AUD-RWE" is intended, where relevant.

The monitoring *ex-post* of all other emissions and removals of GHGs shall be accounted for within the relevant Methodology.

3 DEFINITIONS

3.1 Acronyms

GHG	Greenhouse Gas
LCT	Land Cover Transition
SOC	Soil Organic carbon
RWE	Restoration of Wetlands Ecosystems
VCU	Verified Carbon Unit
WRC	Wetlands Restoration and Conservation
AUD	Unplanned Deforestation
AUWD	Avoiding Unplanned Wetlands Degradation

4 APPLICABILITY CONDITIONS

The module is applicable for monitoring emissions from unplanned deforestation (land use transition of forest[1] land to non-forest land in the baseline case).

This module is not applicable where regulated selective logging by the project proponent is taking place in the project case.

Forest strata, as defined in the relevant baseline modules are defined for the Project Baseline Validity Period and may not be changed in between baseline reassessments. In the event that a large-scale natural disturbance[2] has taken place within the AUD Project Area and/or AUD Leakage Belt during the Monitoring Period, the area disturbed shall be delineated and this shall be treated as a separate forest strata. The application of BL-UD shall then be updated.

The module is mandatory for AUD, AUD-AUWD, and AUD-RWE project activities.

5 PROCEDURES

5.1 Monitoring Deforestation

5.1.1 Development of Land Cover Transition Data within the AUD Project Area and AUD Leakage Belt for the Monitoring Period

To calculate the area of land cover transitions that have taken place within the AUD Project Area and AUD Leakage Belt over the Monitoring Period, the same approach must be employed that was used for baseline setting. To calculate the Activity Data that took place over the Monitoring Period, the methods delineated within J-ADB-UD Section 5.5.1, Steps 1-5 shall be replicated for the AUD Project Area and Leakage Belt. All equations referencing A_J shall instead be performed on $A_{PA\text{-}UD}$ And $A_{LB\text{-}UD}$. If the project utilized multiple forest strata in the development of baseline, it shall use those same strata in monitoring. No monitoring should take place within the non-UD stratum of the Leakage Belt. Additional sampling strata unrelated to the forest class may optionally be employed to improve precision of the estimate

1 Mangrove forests are excluded from any tree height requirement in a forest definition, as they consist of (close to) 100% mangrove species, which often do not reach the same height as other tree species, and occupy contiguous areas and their functioning as a forest is independent of tree height.

2 Such as tectonic activity (earthquake, landslide, volcano), extreme weather (hurricane), pest, drought, or fire that result in a significant degradation of forest carbon stock

of activity data. Accordingly, each Land Cover Transition *LCT* recorded in the sample-based monitoring shall be additionally segmented by forest strata *i*, resulting in the following modifications to J-ADB-UD presented in Table 1.

Table 1. Adjustments of parameters in J-ADB-UD, in application within MON-AUD

Parameter in J-ADB-UD	Parameter in MON-AUD
$Count_{J,AD\text{-}C,LCT,ss}$	$Count_{PA,AD\text{-}C,LCT,ss,i}$, $Count_{PA,AD\text{-}C,LCT,ss,i}$
$A_{J,ss}$	$A_{MP,PA\text{-}UD,ss}$, $A_{MP,LB\text{-}UD,ss}$
$Prop_{J,\ AD\text{-}C,LCT,ss}$	$Prop_{PA\text{-}UD,AD\text{-}C,LCT,ss,i}$, $Prop_{LB\text{-}UD,AD\text{-}C,LCT,ss,i}$
$Prop_{J,\ AD\text{-}C,LCT}$	$Prop_{PA\text{-}UD,AD\text{-}C,LCT,i}$, $Prop_{LB\text{-}UD,AD\text{-}C,LCT,i}$

The allocation of sample observations to forest strata *i* shall be determined by the locations of sample plots within the most recent Project Forest Stratification Map, and not by forest cover interpretation of sample plots themselves.

Since the AUD Project Area and Leakage Belt will often be much smaller than the jurisdictional area, this will usually involve intensifying the sampling density to arrive at an acceptable precision in estimating change areas.

This shall result in the area of deforestation over the Monitoring Period within the AUD Project Area and AUD Leakage Belt, however, to conservatively estimate the uncertainty, the Equation 20 and 21 of the J-ADB-UD shall be replaced with:

$$A_{MP,PA\text{-}UD,Def} = A_{MP,PA\text{-}UD,Def\text{-}UnDis} - (A_{MP,PA\text{-}UD,Def\text{-}UnDis} * DF_{Def}) \quad (1)$$

$$A_{MP,LB\text{-}UD,Def} = A_{MP,LB\text{-}UD,Def\text{-}UnDis} - (A_{MP,LB\text{-}UD,Def\text{-}UnDis} * DF_{Def}) \quad (2)$$

Where:

$A_{MP,PA\text{-}UD,Def}$	Area of Deforestation within the AUD Project Area over the Monitoring Period, discounted for Uncertainty; ha
$A_{MP,LB\text{-}UD,Def}$	Area of Deforestation within the AUD Leakage Belt over the Monitoring Period, discounted for Uncertainty; ha
$A_{MP,PA\text{-}UD,Def\text{-}UnDis}$	Undiscounted Area of Deforestation within the AUD Project Area over the Monitoring Period; ha
$A_{MP,LB\text{-}UD,Def\text{-}UnDis}$	Undiscounted Area of Deforestation within the AUD Leakage Belt over the Monitoring Period; ha
$DF_{Def\text{-}PA}$	Discount factor for deforestation; %

Thus, using equation 23 of the Module J-ADB-UD will result in: $A_{PA\text{-}UD\text{-}annual,activity}$ and $A_{LB\text{-}UDannual,activity}$.

For each Land Cover Transition associated with an Activity, Activity Data for Land Cover Transition is then calculated as:

$$AD_{MP\text{-}PA\text{-}UD,AD\text{-}C,LCT,i} = AD_{MP\text{-}PA\text{-}UD,AD\text{-}C} * (Prop_{PA\text{-}UD,AD\text{-}C,LCT,i} / Prop_{PA\text{-}UD,AD\text{-}C}) \quad (3)$$

$$AD_{MP\text{-}LB\text{-}UD,AD\text{-}C,LCT,i} = AD_{MP\text{-}LB\text{-}UD,AD\text{-}C} * (Prop_{LB\text{-}UD,AD\text{-}C,LCT,i} / Prop_{LB\text{-}UD,AD\text{-}C}) \quad (4)$$

Where:

$AD_{MP\text{-}PA\text{-}UD,AD\text{-}C,LCT,i}$	Activity data for Land Cover Transition *LCT* within AD Category *AD-C* for the Monitoring Period in the AUD Project Area, in forest stratum *i*; *ha* y^{-1}
$AD_{MP\text{-}LB\text{-}UD,AD\text{-}C,LCT,i}$	Activity data for Land Cover Transition *LCT* within AD Category *AD-C* for the Monitoring Period in the AUD Leakage Belt, in forest stratum *i*; *ha* y^{-1}
$AD_{MP\text{-}PA\text{-}UD,AD\text{-}C}$	Activity data for AD Category for the Monitoring Period in the AUD Project Area; *ha* y^{-1}
$AD_{MP\text{-}LB\text{-}UD,AD\text{-}C}$	Activity data for AD Category for the Monitoring Period in the AUD Leakage Belt; *ha* y^{-1}
$Prop_{PA\text{-}UD,AD\text{-}C,LCT,i}$	Proportion of A_{PA} classified as AD Category *AD-C,* Land Cover Transition *LCT*, forest stratum *i*; dimensionless
$Prop_{PA\text{-}UD\text{-},AD\text{-}C}$	Proportion of $A_{PA\text{-}UD}$ classified as AD Category *AD-C*; dimensionless
$Prop_{LB\text{-}UD,AD\text{-}C,LCT,i}$	Proportion of A_{LB} classified as AD Category *AD-C,* Land Cover Transition *LCT*, forest stratum *i*; dimensionless
$Prop_{LB\text{-}UD\text{-},AD\text{-}C}$	Proportion of $A_{LB\text{-}UD}$ classified as AD Category *AD-C*; dimensionless
AD-C	AD Category: Deforestation, Stable Forest, Stable Non-Forest
LCT	1,2,3…LCT* Land Cover Transition classes
i	1,2,3…M forest strata

For the non-UD stratum of the Leakage Belt, the area of deforestation shall always be assigned a value of zero ($AD_{MP\text{-}PA\text{-}UD,AD\text{-}C,LCT,i=nonUD} = 0$)

5.1.2 Estimation of carbon stock changes per stratum

For estimating emissions resulting from Deforestation in the project case, the same conservatively discounted estimates of carbon stock differences shall be used, which were established for the baseline scenario.

No carbon stocks are assessed for the non-UD stratum of the Leakage Belt.

As in the BL-UD, for AUD-AUWD and AUD-RWE project activities, and thus all strata containing wetland soils, the non-wetland soil carbon pool ($\Delta C_{NonW\text{-}SOC,i}$) shall be set to zero and instead estimates of soil GHG emissions following wetland degradation ($GHG_{BSL\text{-}PEAT}$ or $GHG_{BSL\text{-}TW}$) shall employ the relevant sections of the applied methodology.

5.1.3 Estimation of the annual emissions from carbon stock changes during the monitoring period

For estimating changes in carbon stocks in the project case, the same calculations delineated in BL-UD shall be carried out that were also carried out for the baseline case. This will involve using the same conservatively discounted estimates of carbon stock differences that were established for the baseline.

Stock changes in living biomass, deadwood and litter are assumed to be emitted at the time of the land use transition. Following the land use transition, emissions from non-wetland soil and wood products are assumed to take place gradually over time at an annual rate of 1/20 of the stock change. Thus, for a given year t^*, emissions are summed across areas of each land use transition class from time $t=1$ (i.e., project start) up to time t^* (the year for which emissions are to be estimated) (for non-wetland soil organic carbon and wood products).

For terrestrial carbon pools in AUD project activities (non-wetland):

$$\Delta C_{MP\_PA-UD,t} = \sum_{LCT}^{LCT*} \sum_{i}^{M} \Delta C_{MP\_PA-UD,LCT,i,t} \quad (5)$$

$$\Delta C_{MP\_LB-UD,t} = \sum_{LCT}^{LCT*} \sum_{i}^{M} \Delta C_{MP\_LB-UD,LCT,i,t} \quad (6)$$

$$\Delta C_{MP,PA-UD,LCT,i,t*} = (AD_{MP,PA-UD,LCT,i,t*} * \Delta Cc_{AB\_BB\_DW\_LI\_WP,LCT,i}) + \frac{1}{20} * \sum_{1}^{t*} (AD_{MP,PA-UD,LCT,i,t} * \Delta Cc_{NonW-SOC\_WP100,LCT,i}) \quad (7)$$

$$\Delta C_{MP,LB-UD,LCT,i,t*} = (AD_{MP,LB-UD,LCT,i,t*} * \Delta C_{LB,AB\_BB\_DW\_LI\_WP,LCT,i}) + \frac{1}{20} * \sum_{1}^{t*}(AD_{MP,\mathrm{LB}-UD,LCT,i,t} * \Delta C_{LB,NonW-SOC\_WP100,LCT,i}) \quad (8)$$

Where:

$\Delta C_{MP,PA-UD,t}$	Sum of the carbon stock change within AUD Project Area in all terrestrial pools (non-wetland) in year *t* of the Project Activity; t CO_2e
$\Delta C_{MP,LB-UD,t}$	Sum of the carbon stock change within AUD Leakage Belt in all terrestrial pools (non-wetland) in year *t* of the Project Activity; t CO_2e
$\Delta C_{MP,PA-UD,LCTi,t}$	Sum of the carbon stock change within AUD Project Area in all terrestrial pools (non-wetland) in land cover transition *LCT*, in stratum *i*, in year *t* of the Project Activity; t CO_2e
$\Delta C_{MP,LB-UD,LCTi,t}$	Sum of the carbon stock change within AUD Leakage Belt in all terrestrial pools (non-wetland) in land cover transition *LCT*, in stratum *i*, in year *t* of the Project Activity; t CO_2e
$AD_{MP,PA-UD,LCT,i,t}$	Unplanned Deforestation Activity Data in the AUD Project Area in land cover transition *LCT*, in stratum *i*, in year *t* of the Project Activity; ha
$AD_{MP,LB-UD,LCT,i,t}$	Unplanned Deforestation Activity Data in the AUD Leakage Belt in land cover transition *LCT*, in stratum *i*, in year *t* of the Project Activity; ha
$\Delta Cc_{AB\_BB\_DW\_LI\_WP,i}$	Conservatively estimated carbon stock change to occur over a one-year period in aboveground; belowground; deadwood; and litter pools in stratum *i*; t CO_2e ha^{-1}
$\Delta Cc_{NonW-SOC\_WP100,i}$	Conservatively estimated carbon stock change to occur over a one-year period in the non-wetland soil organic carbon and wood products pools in stratum *i*; t CO_2e ha^{-1}
$\Delta C_{LB,AB\_BB\_DW\_LI\_WP,i}$	Estimated carbon stock change to occur over a one-year period in the AUD Leakage Belt in aboveground; belowground; deadwood; and litter pools in stratum *i* ; t CO_2e ha^{-1}
$\Delta C_{LB,NonW-SOC\_WP100,i}$	Estimated carbon stock change to occur over a 20-year period in the AUD Leakage Belt in the non-wetland soil organic carbon and wood products pools in stratum *i*; t CO_2e ha^{-1}
LCT	1,2,3…LCT* Land Cover Transitions
i	1, 2, 3, … M strata
t	1, 2, 3, … *t** years elapsed since the projected start of the project activity

5.1.4 Estimation of monitored greenhouse gas emissions from wetlands SOC pool

For the wetlands SOC pool in AUD-AUWD or AUD-RWE project activities, use the relevant sections of the applied methodology to estimate soil GHG emissions following wetland degradation ($GHG_{BSL\text{-}PEAT}$ or $GHG_{BSL\text{-}TW}$) within the AUD Project Area and AUD Leakage Belt.

For instance, when using Modules *M-PEAT* or *M-TW*, for all wetland strata, $A_{WPS,i,t}$ (Area of stratum *i* in year *t* in the AUD Project Area and AUD Leakage Belt in the project scenario) must be quantified. $A_{WPS,i,t}$ and $A_{WPS,LB,i,t}$ are equal to $AD_{MP,PA\text{-}UD,LCT,i,t}$ and $AD_{MP,LB\text{-}UD,LCT,i,t}$, respectively. These areas are subject to stratification[3].

On forested peatland:

$GHG_{MP\_PA\text{-}UD,PEAT,t} = GHG_{MP\text{-}PEAT,t}$ for the AUD Project Area (9)

$GHG_{MP\_LB\text{-}UD,PEAT,t} = GHG_{MP\text{-}PEAT,t}$ for the AUD Leakage Belt (10)

On tidal forested wetland:

$GHG_{MP\_PA\text{-}UD,TW,t} = GHG_{MP\text{-}TW,t}$ for the AUD Project Area (11)

$GHG_{MP\_LB\text{-}UD,TW,t} = GHG_{MP\text{-}TW,t}$ for the AUD Leakage Belt (12)

Where:

$GHG_{MP\_PA\text{-}UD,PEAT,t}$	Net GHG emissions from unplanned peatland degradation in the AUD Project Area in year t of the Project Activity; t CO_2e
$GHG_{MP\_LB\text{-}UD,PEAT,t}$	Net GHG emissions from unplanned peatland degradation in the AUD Leakage Belt in year t of the Project Activity; t CO_2e
$GHG_{MP\_PA\text{-}UD,TW,t}$	Net GHG emissions from unplanned tidal wetland degradation in the AUD Project Area in year t of the Project Activity; t CO_2e
$GHG_{MP\_LB\text{-}UD,TW,t}$	Net GHG emissions from unplanned tidal wetland degradation in the AUD Leakage Belt in year t of the Project Activity; t CO_2e
$GHG_{MP\text{-}PEAT,t}$	Net GHG emissions in the WRC baseline scenario on peatland in year t of the Project Activity; t CO_2e (from Module *BL-PEAT*)

[3] Module *BL-PEAT*, for example, distinguishes area of ditch and other open water, area of peat burnt and area of peatland (not open water, not burnt).

$GHG_{MP\text{-}TW,t}$	Net GHG emissions in the WRC baseline scenario on tidal wetland in year t of the Project Activity; t CO_2e (from Module *BL-TW*)

5.2 Estimation of the sum of other greenhouse gas emissions

In addition, any other GHG emissions that took place due to Project activities in within the Unplanned Deforestation Project Area shall be estimated.

The other GHG emissions within the AUD project area can be estimated as:

$$GHG_{MP\_PA-UD,E} = \sum_{t=1}^{t^*} \sum_{LCT}^{LCT*} \sum_{i=1}^{M} \left(E_{FC,i,t} + E_{BiomassBurn,i,t} + N_2O_{direct-N,i,t}\right) \quad (13)$$

Where:

$GHG_{MP\_PA\text{-}UD,E}$	Other greenhouse gas emissions as a result of unplanned deforestation activities within the AUD Project Area up to year *t** of the project activity; t CO_2e
$E_{FC,i,t}$ t CO_2e	Net CO_2e emission from fossil fuel combustion in stratum *i* in year *t*;
$E_{BiomassBurn,i,t}$	Non-CO_2 emissions due to biomass burning as part of unplanned deforestation activities in stratum *i* in year *t*; t CO_2e
$N_2O_{direct\text{-}N,i,t}$	Direct N_2O emission as a result of nitrogen application on the alternative land use in stratum *i* in year *t*; t CO_2e
LCT	1,2,3…LCT* Land Cover Transitions
i	1, 2, 3, … *M* strata
t	1, 2, 3, …t^* years elapsed since the projected start of the AUD Project Baseline Validity Period

For detailed information regarding the calculation of $E_{FC,i,t}$, $E_{BiomassBurn,i,t}$ and $N_2O_{direct\text{-}N,i,t}$ see the relevant Methodology. Other GHG emission sources excluded from the project boundary can be neglected, i.e., accounted as zero. For the determination which sources of emissions must be included in the calculations as a minimum see the relevant Methodology.

5.3 Calculation of net emissions during the Monitoring Period

The net emissions are then calculated as:

$$\Delta C_{MP,\mathrm{PA}-UD} = \left(\sum_{t=1}^{t*} \sum_{LCT=1}^{LCT^*} \sum_{i=1}^{M} \Delta C_{MP,PA-UD,LCT,i,t}\right) + GHG_{MP_{PA}-UD,PEAT} + GHG_{MP\_PA-UD,TW} + GHG_{MP\_PA-UD,E} \quad (14)$$

$$\Delta C_{MP,\mathrm{LB}-UD} = \left(\sum_{t=1}^{t*}\sum_{LCT=1}^{LCT^*}\sum_{i=1}^{M}\Delta C_{MP,\mathrm{LB}-UD,LCT,i,t}\right) + GHG_{MP\_LB-UD,PEAT,t} + GHG_{MP\_LB-UD,TW,t} \quad (15)$$

Where:

ΔC_{MP_PA-UD}	Net greenhouse gas emissions within the AUD Project Area up to year *t**; t CO_2e
ΔC_{MP_LB-UD}	Net greenhouse gas emissions within the AUD Leakage Belt up to year *t**; t CO_2e
$\Delta C_{MP\_PA-UD,LCTi,t}$	Sum of the emissions from carbon stock change within AUD Project Area in all terrestrial pools (excluding wetland soils) in land cover transition *LCT*, in stratum *i*, in year *t* of the project activity*;* t CO_2e
$\Delta C_{MP\_LB-UD,LCTi,t}$	Sum of the emissions from carbon stock change within AUD Leakage Belt in all terrestrial pools (excluding wetland soils) in land cover transition *LCT*, in stratum *i*, in year *t;* t CO_2e
$GHG_{MP\_PA-UD,PEAT,t}$	Net GHG emissions from unplanned peatland degradation in the AUD Project Area in year *t*; t CO_2e
$GHG_{MP\_LB-UD,PEAT,t}$	Net GHG emissions from unplanned peatland degradation in the AUD Leakage Belt in year t; t CO_2e
$GHG_{MP\_PA-UD,TW,t}$	Net GHG emissions from unplanned tidal wetland degradation in the AUD Project Area in year t; t CO_2e
$GHG_{MP\_LB-UD,TW,t}$	Net GHG emissions from unplanned tidal wetland degradation in the AUD Leakage Belt in year t; t CO_2e
$GHG_{MP\_PA-UD,E}$	Other greenhouse gas emissions as a result of deforestation activities within the AUD Project Area up to year *t** of the project activity; t CO_2e
i	1, 2, 3, … *M* strata
LCT	1,2,3…LCT* Land Cover Transitions
t	1, 2, 3, … *t** years elapsed since the projected start of the AUD project activity

6 DATA AND PARAMETERES

6.1 Data and Parameters Available at Validation

Data / Parameter	Digital Map of Jurisdictional Boundaries
Data unit	Digital Map
Description	Digital raster or vector map depicting all areas included in the Jurisdiction.
Equations	n/a
Source of data	Verra, defined from application of J-ADB-UD Module
Value applied	n/a
Justification of choice of data or description of measurement methods and procedures applied	n/a
Purpose of Data	Defines the historical reference area and carbon accounting area for all activities.
Comments	

Data / Parameter	Digital Maps of AUD Project Area Boundaries
Data unit	Digital Map
Description	Digital raster or vector map depicting locations of all AUD Project Areas within the Jurisdiction
Equations	n/a
Source of data	Module BL-UD
Value applied	n/a

Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	Used with the Jurisdictional Risk Map and the JNR Allocation Tool to allocate baseline Activity Data to each AUD Project Area within the coming crediting year.
Comments	

Data / Parameter	Digital Maps of AUD Leakage Belt
Data unit	Digital Map
Description	Digital raster or vector map depicting locations of all AUD Project Leakage Belts within the Jurisdiction
Equations	n/a
Source of data	Module BL-UD, potentially modified by Verra: The boundaries of the LB may be modified to correct for overlaps between projects. AUD project must demonstrate that it utilizes the most current LB boundaries maintained by Verra.
Value applied	n/a
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data	
Comments	Used with the Jurisdictional Risk Map and the JNR Allocation Tool to allocate baseline Activity Data to each AUD Project Area within the coming crediting year.

Data / Parameter	$A_{PA\text{-}UD}$
Data unit	ha
Description	Area of project where Avoided Unplanned Deforestation activities will take place

Equations	Used in the development of the AUD Project Risk Map
Source of data	Module BL-UD
Value applied	
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data Comments	Calculation of project emissions

Data / Parameter	$A_{LB\text{-}UD}$
Data unit	ha
Description	Area of the Leakage Belt where unplanned deforestation in the project area may be displaced due to project activities
Equations	Used in the development of the AUD Leakage Belt Risk Map
Source of data	Module BL-UD
Value applied	
Justification of choice of data or description of measurement methods and procedures applied	
Purpose of Data Comments	Calculation of monitored emissions in the leakage belt

6.2 Data and Parameters Monitored

Data / Parameter:	Standard Operating Procedures for Sample Plot interpretation

Data unit:	
Description:	Document describing the methods and guidance provided to analysts in interpreting high resolution imagery and/or conducting field observations.
Equations	
Source of data:	Project Developer responsible for developing $Count_{J,AD\text{-}C,LCT,ss}$. Standard Operating Procedures developed by J-ADB-UD data developer may be adapted if appropriate for project landscape.
Description of measurement methods and procedures to be applied:	The Standard Operating Procedures must comply with all relevant requirements of J-ADB-UD Module
Frequency of monitoring/recording:	Prior to start of Monitoring Period
QA/QC procedures to be applied:	Must include reference to QA/QC procedures undertaken by $Count_{AD\text{-}C,LCT,ss}$ data developers
Purpose of data:	Methods employed for sample plot interpretation
Calculation method:	
Comments:	Must include reference to QA/QC procedures undertaken by $Count_{AD\text{-}C,LCT,ss}$ data developers

Data / Parameter:	Sample Plot Record Table
Data unit:	Sampling units
Description:	Table containing at least one entry per interpreted sample plot, indicating at a minimum: XY coordinate of centroid with a specified coordinate system, imagery source (sensor/platform), spatial resolution, collection date, records related to observation of physical or land-use criteria used in interpretation, and final determination of Activity Data Category AD-C Land Cover Transition LCT.
Equations	
Source of data:	Interpretation of high resolution satellite imagery and ground measurements.
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Prior to start of Monitoring Period

QA/QC procedures to be applied:	As described in *Standard Operating Procedures for Sample Plot interpretation*
Purpose of data:	Serves as the basis of estimation of areas for all Activity Data Categories AD-C and Land Cover Transitions LCT
Calculation method:	
Comments:	

Data / Parameter:	$Count_{PA,AD\text{-}C,LCT,ss,i}$
Data unit:	Sampling units
Description:	Count of the sample units within the AUD Project Area that fall into sampling stratum ss and are classified as AD Category AD-C and Land Cover Transition LCT; dimensionless
Equations	
Source of data:	Interpretation of high-resolution satellite imagery and ground measurements.
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Prior to start of Monitoring Period
QA/QC procedures to be applied:	As described in *Standard Operating Procedures for Sample Plot interpretation*
Purpose of data:	Serves as the basis of estimation of areas for all Activity Data Categories AD-C and Land Cover Transitions LCT
Calculation method:	Approach must comply with all relevant requirements of J-ADB-UD Module.
Comments:	

Data / Parameter:	$Count_{LB,AD\text{-}C,LCT,ss,i}$
Data unit:	Sampling units
Description:	Count of the sample units within the AUD Leakage Belt that fall into sampling stratum ss and are classified as AD Category AD-C and Land Cover Transition LCT; dimensionless
Equations	

Source of data:	Interpretation of high resolution satellite imagery and ground measurements.
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Prior to start of Monitoring Period
QA/QC procedures to be applied:	As described in *Standard Operating Procedures for Sample Plot interpretation*
Purpose of data:	Serves as the basis of estimation of areas for all Activity Data Categories AD-C and Land Cover Transitions LCT
Calculation method:	Approach must comply with all relevant requirements of J-ADB-UD Module
Comments:	

Data / Parameter:	t_{start},*AD-C,ss,s* t_{end},*AD-C,ss,s*
Data unit:	Date in days
Description:	Date of image used to interpret the Start and End dates of a land cover transition for *sample* s classified as AD Category *AD-C* in Sampling Stratum *ss*
Equations	*22*
Source of data:	Metadata provided with high resolution imagery used in sample plot interpretation. For ground observations, date of field visit.
Description of measurement methods and procedures to be applied:	
Frequency of monitoring/recording:	Prior to start of Monitoring Period
QA/QC procedures to be applied:	n/a
Purpose of data:	Calibration of Activity Data to timespan between imagery by imagery used in historical analysis.
Calculation method:	
Comments:	For images that are composites of multiple imaging dates, the midpoint of the time period represented in the composite shall be taken as the collection date.

Data / Parameter:	Project Forest Stratification Map
Data unit:	Digital Map
Description:	Digital map of forest strata used in baseline emissions estimates.
Equations	
Source of data:	BL-UD Module
Description of measurement methods and procedures to be applied:	As described in BL-UD Module
Frequency of monitoring/recording:	Prior to start of Monitoring Period
QA/QC procedures to be applied:	As described in BL-UD Module
Purpose of data:	Assigning of land cover change sample observations to forest strata *i*
Calculation method:	
Comments:	

Data / Parameter:	$\Delta Cc_{AB\_BB\_DW\_LI\_WP,i}$
Data unit:	t CO_2e ha^{-1}
Description:	Conservatively estimated carbon stock change to occur over a one-year period in aboveground; belowground; deadwood; and litter pools in stratum *i*
Equations	9
Source of data:	BL-UD Module
Description of measurement methods and procedures to be applied:	n/a
Frequency of monitoring/recording:	Prior to start of each Monitoring Period

QA/QC procedures to be applied:	n/a
Purpose of data:	Employed to calculate the sum of the carbon stock change within AUD Project Area in all terrestrial pools (non-wetland) in a given year
Calculation method:	n/a
Comments:	

Data / Parameter:	$\Delta Cc_{NonW\text{-}SOC\_WP100,i}$
Data unit:	t CO_2e ha^{-1}
Description:	Conservatively estimated carbon stock change to occur over a one-year period in the non-wetland soil organic carbon and wood products pools in stratum *i*
Equations	9
Source of data:	BL-UD Module
Description of measurement methods and procedures to be applied:	n/a
Frequency of monitoring/recording:	Prior to start of each Monitoring Period
QA/QC procedures to be applied:	n/a
Purpose of data:	Employed to calculate the sum of the carbon stock change within AUD Project Area in all terrestrial pools (non-wetland) in a given year
Calculation method:	n/a
Comments:	

Data / Parameter:	$\Delta C_{LB,AB\_BB\_DW\_LI\_WP,i}$
Data unit:	t CO_2e ha^{-1}
Description:	Estimated carbon stock change to occur over a one-year period in the AUD Leakage Belt in aboveground; belowground; deadwood; and litter pools in stratum *i*
Equations	9

Source of data:	BL-UD Module
Description of measurement methods and procedures to be applied:	n/a
Frequency of monitoring/recording:	Prior to start of each Monitoring Period
QA/QC procedures to be applied:	n/a
Purpose of data:	Employed to calculate the sum of the carbon stock change within AUD Leakage Belt in all terrestrial pools (non-wetland) in a given year
Calculation method:	n/a
Comments:	

Data / Parameter:	$\Delta C_{LB,NonW\text{-}SOC\_WP100,}$
Data unit:	t CO_2e ha^{-1}
Description:	Estimated carbon stock change to occur over a 20-year period in the AUD Leakage Belt in the non-wetland soil organic carbon and wood products pools in stratum *i*
Equations	10
Source of data:	BL-UD Module
Description of measurement methods and procedures to be applied:	n/a
Frequency of monitoring/recording:	Prior to start of each Monitoring Period
QA/QC procedures to be applied:	n/a
Purpose of data:	Employed to calculate the sum of the carbon stock change within AUD Leakage Belt in all terrestrial pools (non-wetland) in a given year
Calculation method:	n/a
Comments:	

Data / Parameter:	$GHG_{MP\text{-}PEAT,t}$

Data unit:	t CO_2e
Description:	Net GHG emissions in the WRC baseline scenario on peatland in year t of the Project Activity
Equations	9, 10
Source of data:	Module BL-PEAT
Description of measurement methods and procedures to be applied:	Must be calculated separately for both the AUD Project Area and the AUD Leakage Belt area
Frequency of monitoring/recording:	Prior to each Monitoring Period
QA/QC procedures to be applied:	
Purpose of data:	Emissions taking place from peatland soils during year t of Project Activity
Calculation method:	
Comments:	

Data / Parameter:	$GHG_{MP\text{-}TW,t}$
Data unit:	t CO_2e
Description:	Net GHG emissions in the WRC baseline scenario on tidal wetlands in year t of the Project Activity
Equations	11, 12
Source of data:	Module BL-TW
Description of measurement methods and procedures to be applied:	Must be calculated separately for both the AUD Project Area and the AUD Leakage Belt area
Frequency of monitoring/recording:	Prior to each Monitoring Period
QA/QC procedures to be applied:	
Purpose of data:	Emissions taking place from tidal wetland soils during year t of Project Activity
Calculation method:	
Comments:	

7 REFERENCES