



VERRA'S REDD+ TEAM & CONSULTANTS

19 December 2023

# VM0048: Reducing Emissions from Deforestation and Forest Degradation



# Agenda

- Introduction
- Overview of activity data collection and allocation
  - Activity data collection
  - Risk mapping and allocation
  - Roles and responsibilities
- Deep dive into *VMD0055 Estimating Emissions Reductions from Avoiding Unplanned Deforestation, v1.0*
- Next steps



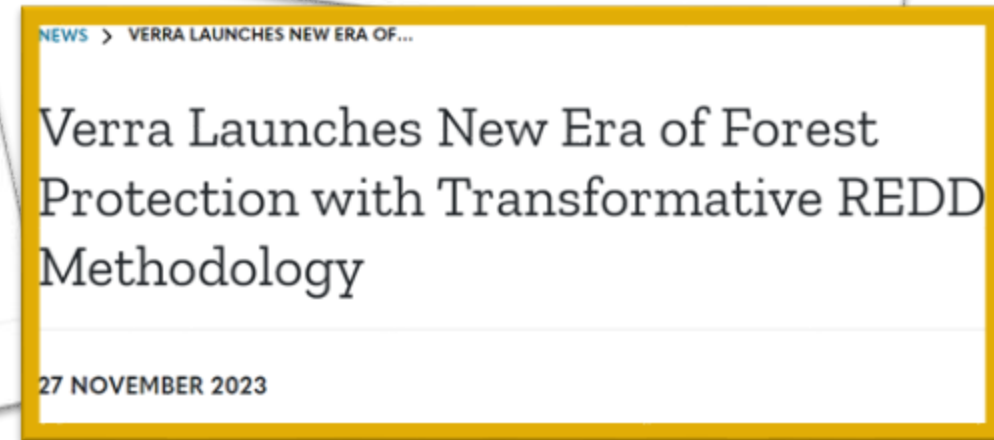
# Context

# Methodology development team

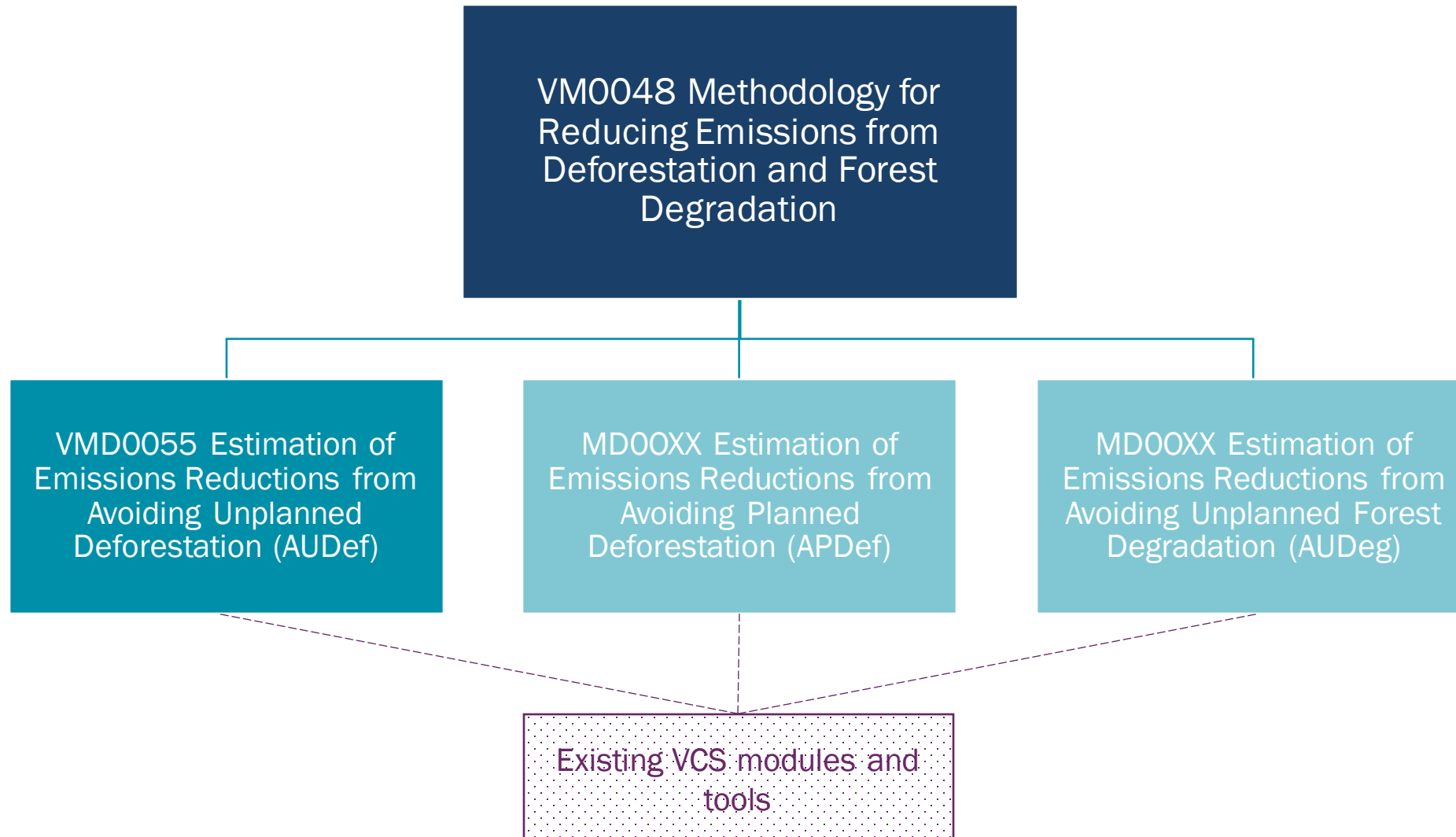
- Methodology/overall support
  - Dr. Tim Pearson (GreenCollar)
  - Kevin Brown (Wildlife Conservation Society)
  - Dr. Sarah Walker (Wildlife Conservation Society)
  - Simon Koenig (Climate Focus)
  - Dr. Till Neeff (independent)
  - Dr. Iginio Emmer (Silvestrum)
  - David Shoch (TerraCarbon)
- Risk mapping and modeling and allocation procedures
  - Dr. Lucio Pedroni (Carbon Decisions International)
  - Juan Felipe Villegas (Carbon Decisions International)
  - Prof. Robert Gil Pontius (Clark University)
  - Prof. J. Ronald Eastman (Clark Labs)
  - Dr. Rebecca Dickson (Terra Carbon and Clark Labs)
- Verra staff
  - Salvador Sánchez Colón, Manager, REDD+ Technical Innovation
  - Andrew Copenhaver, Manager, Forest Carbon Data Innovation
  - Marie Calmel, Technical Director, Natural Climate Solutions
  - Julie Baroody, Senior Director, Forest Carbon Innovation
  - Naomi Swickard, Senior Director, REDD+ Program Development and Innovation

# REDD is evolving

- Shorter baseline periods for REDD projects
- Consolidating methodologies
  - Retired VM0009 and VM0037
  - Updated VM0007 and VM0015
- Risk-based jurisdictional allocation



# Methodology Structure





# Activity Data Collection and Allocation

Activity Data Collection  
Risk Mapping and Allocation  
Roles and Responsibilities

# Activity data and forest cover benchmark maps

Multitemporal satellite imagery



**Forest cover benchmark map**  
(forest-non-forest at 3-time points over the HRP)

Sample plots



**Land cover change transitions**  
(stable forest, stable non-forest, **deforestation**, and forest regrowth)

- Jurisdictional activity data is data on the magnitude (area) of deforestation taking place during a given period of time
- Forest cover benchmark maps (FCBM) used for identifying transitions and stratifying samples for visual interpretation



# Activity data and forest cover benchmark maps - requirements

Primary Data/product	Minimum Requirement
Satellite imagery	10m spatial resolution; potential exceptions based on imagery availability for earlier HRPs
Uncertainty of sample-based deforestation estimates	≤ 20% at a 90% CI; ≤ 10% to avoid discount
Accuracy of FCBM change category (closed forest)	90% & 70% for forest (end of HRP) and deforestation (during HRP) classes, respectively
Accuracy of FCBM change category (open forest, i.e., <50% CC)	80% & 60% for forest and deforestation classes, respectively



[Request for Proposals for Development of Jurisdictional Activity Data and Forest Cover Benchmark Maps for VCS Avoiding Unplanned Deforestation Projects](#) – Deadline: 02 January 2024

REDD Methodology page

# Crowdsourced supplemental data

Data	Potential Use
Sample plots, spatial stratification, land cover maps, identified exclusions, etc.,	Activity data (AD) generation
Remote sensing imagery, ancillary spatial data, projects FCBMs, etc.,	Forest cover benchmark maps (FCBMs)
Maps of potentially arable land/ protection status/accessibility, carbon stock maps.	Maps of available land for activity shifting, EF for outside leakage belt



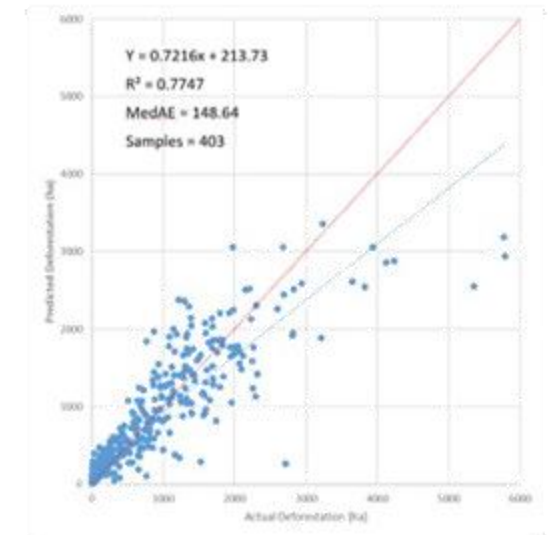
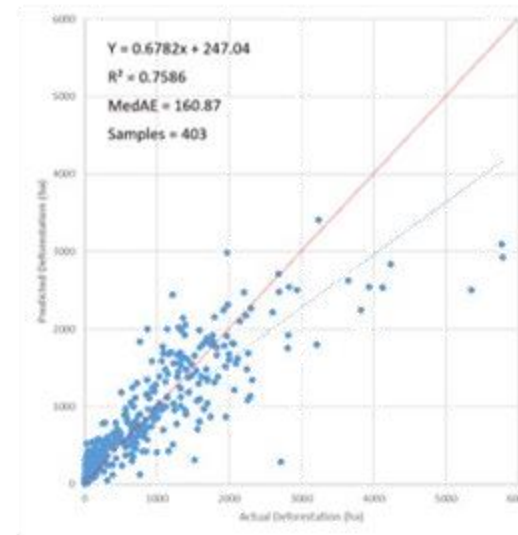
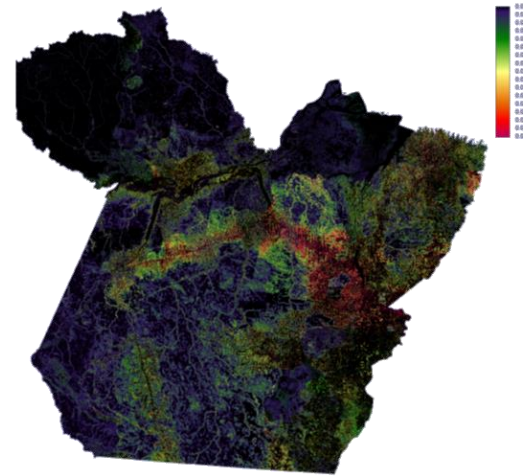
Submission of supplemental materials from stakeholders – Another call expected Q1

# Allocation of jurisdictional activity data

- Jurisdictional activity data are allocated to projects in the jurisdiction proportionally to the local risk of deforestation
  - The *Unplanned Deforestation Risk Modeling and Mapping Procedure (UDef-AT)* is used for assessing/projecting deforestation risk in a spatially-explicit fashion and allocating portions of the jurisdictional activity data to projects within the jurisdiction
- Projects develop local-level estimates of relevant emission factors
- Allocated activity data × estimated emission factors = projects' baselines

# Unplanned Deforestation Allocation Tool (UDef-AT)

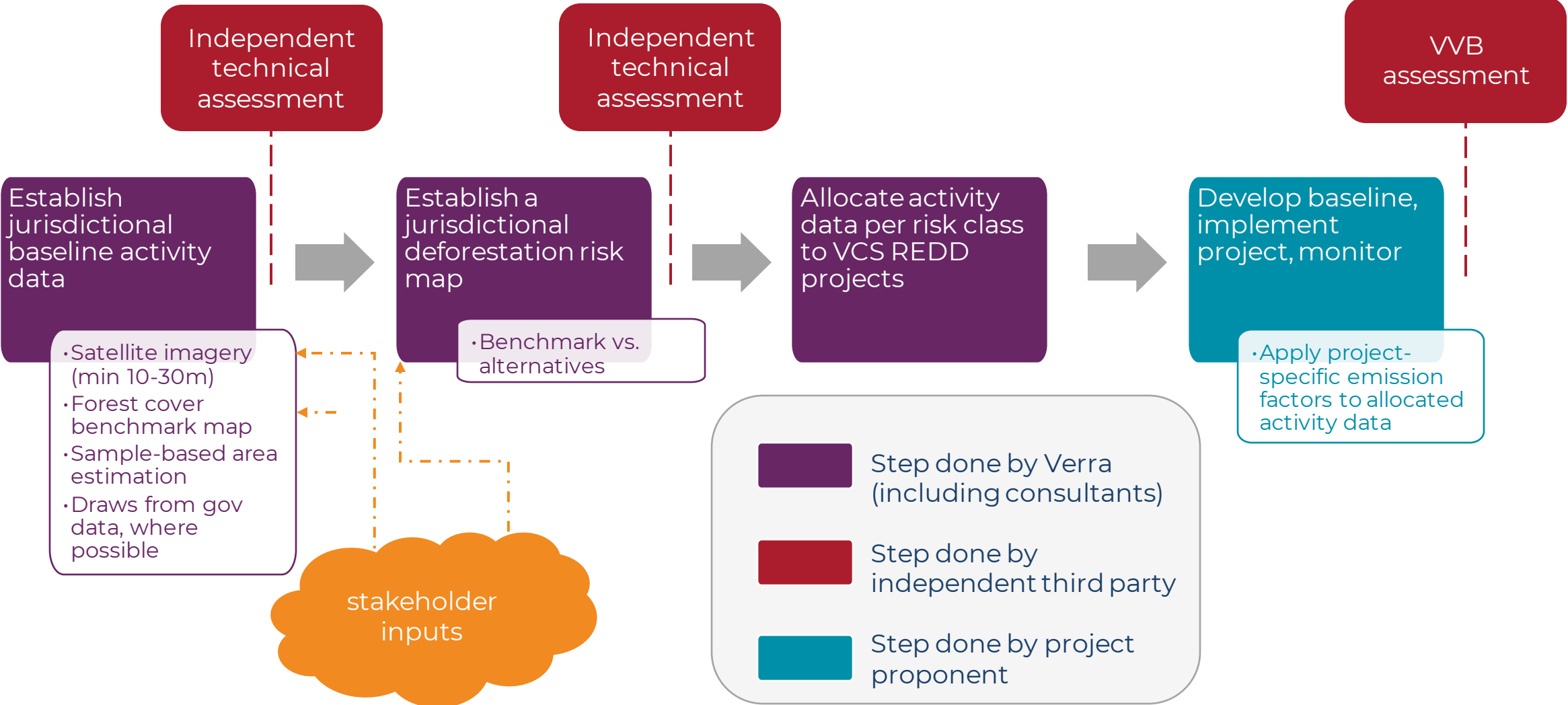
- Benchmark model:
  - Deforestation risk =  $f(\text{Distance to forest edge})$
- Alternative, information-richer models:
  - Deforestation risk =  $f(X_1, X_2, \dots, X_p)$
- Identification of model "best able" to predict deforestation in the coming years:
  - Coarse grid cells sized to be representative of REDD projects in the jurisdiction
  - Median Absolute Error (MedAE) calculated, in hectares, for predicted and mapped deforestation in the coarse grid cells for benchmark and alternative maps
  - Alternative model must outperform benchmark model in both calibration and confirmation periods to be considered (i.e. lower MedAE for both tests)



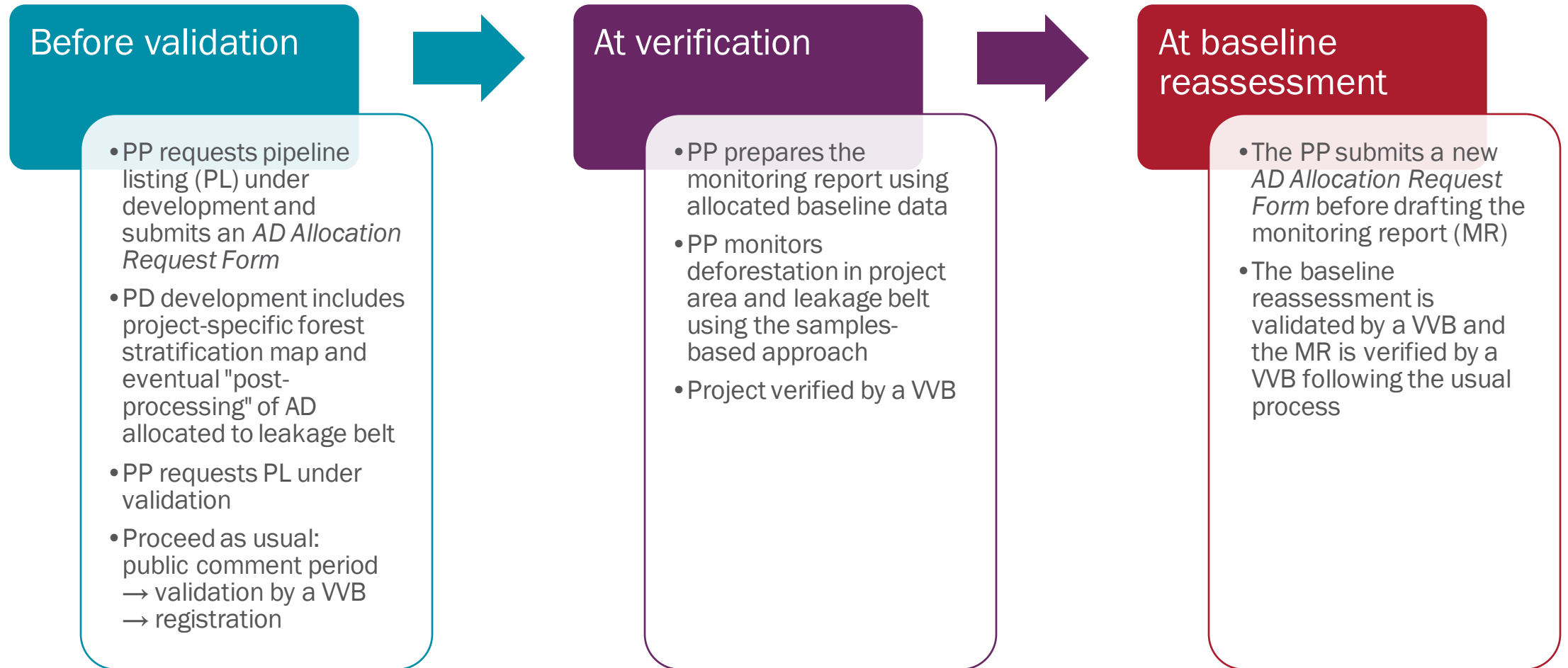
# Unplanned Deforestation Allocation Tool (UDef-AT)

- Initial version:
  - Developed in the context of VCS Jurisdictional and Nested REDD Framework
  - Aimed at allocating portions of a jurisdictional FREL to nested projects
  - Spreadsheet tool
- (On-going) revision of the *UDef-AT*:
  - Python-based geospatial tool
  - To be used for either:
    - VCS Jurisdictional and Nested REDD program or
    - Consolidated REDD Methodology
  - Able to allocate portions of either:
    - Jurisdictional FREL (to projects nested in a JNR program)
    - Jurisdictional activity data (to projects within the jurisdiction using the Consolidated Methodology)

# Accounting approach of the consolidated REDD methodology



# Process





# Activity Data Collection and Allocation

Questions



An aerial photograph of a lush tropical forest, likely a peatland or mangrove area, featuring numerous palm trees. A thick layer of mist or fog hangs over the forest, obscuring the ground and creating a serene, ethereal atmosphere. The sky is a pale, hazy blue with soft, wispy clouds. A dark blue diagonal graphic element is present on the right side of the image.

# ***VMD0055* AUDef Module**

Module for Estimating  
Emissions Reductions  
from Avoiding Unplanned  
Deforestation (AUDef)

# The high-level view of the AUDef module

- Jurisdiction-level standardization of baseline activity data that is allocated to the projects via risk modeling
- Leakage divided between geographically-constrained agents (monitored in leakage belt) and non-geographically constrained agents
  - Leakage belt around project determined by Verra / DSP
  - Jurisdiction level standardization of factors associated with leakage by non-geographically constrained deforestation agents
- Project responsible for:
  - Development of emission factors
  - Activity data in project case (monitoring) of project area and leakage belt
- Activity data through remote sensing with resolution of at least 30 m up to 2015 and at least 10 m after 2015. Sampling approach required
- Uncertainty handled through discounting of both emission factors and activity data

# Applicability

- Methodology level: exclusion of tidal wetlands (included in update to VM0033) and peatlands (upcoming new methodology)
- Module level:
  - Exclusion of planned deforestation
  - Exclusion of leakage prevention activities which will cause emissions not accounted in the module (drainage of wetlands, flooded agriculture, confined feeding operations)

# Overview of module steps

## 1. Project additionality and efficacy

- a. Additionality
- b. Define efficacy
  - i. Leakage management area
  - ii. Deforestation agents and causal chain
- c. Estimate efficacy
  - i. Project efficiency at reducing deforestation
  - ii. Internal permanence risks
  - iii. Risks of leakage

## 2. Define baseline

- a. AD by risk class from Verra
- b. Allocate AD to strata
- c. Estimate discounted emission factors
- d. Determine annual baseline emissions

## 3. Determine project emissions

- a. Estimate ex-ante ERs
- b. Collect AD (inflate for uncertainty in PA)
- c. Determine net emissions

## 4. Estimate leakage emissions

- a. Leakage in leakage belt (geographically constrained)
- b. Leakage outside leakage belt (non-geographically constrained)
- c. Emissions from leakage prevention activities
- d. Market effects leakage

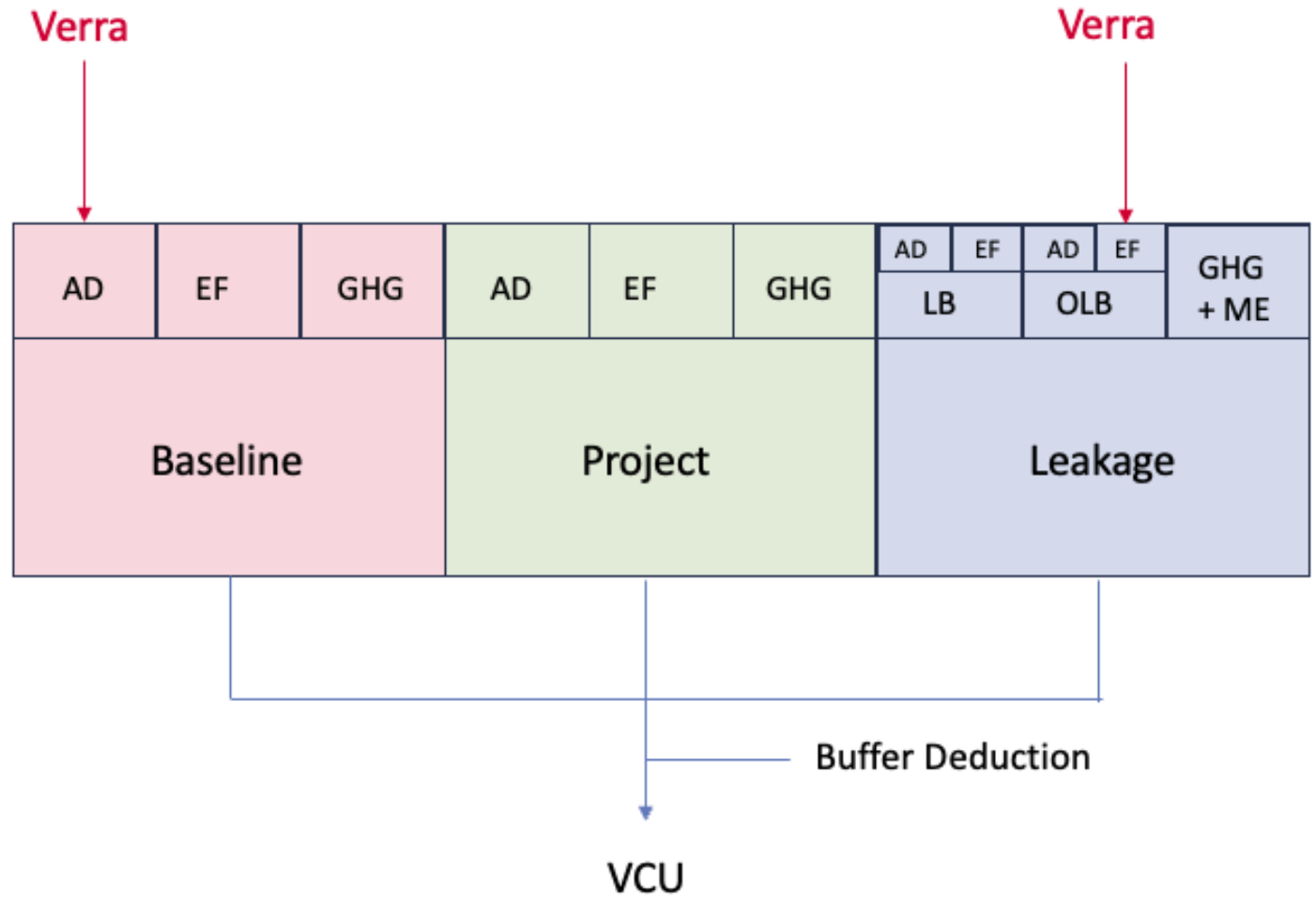
## 5. Sum to determine net emission reductions and subtract permanence deduction

# Key elements of module

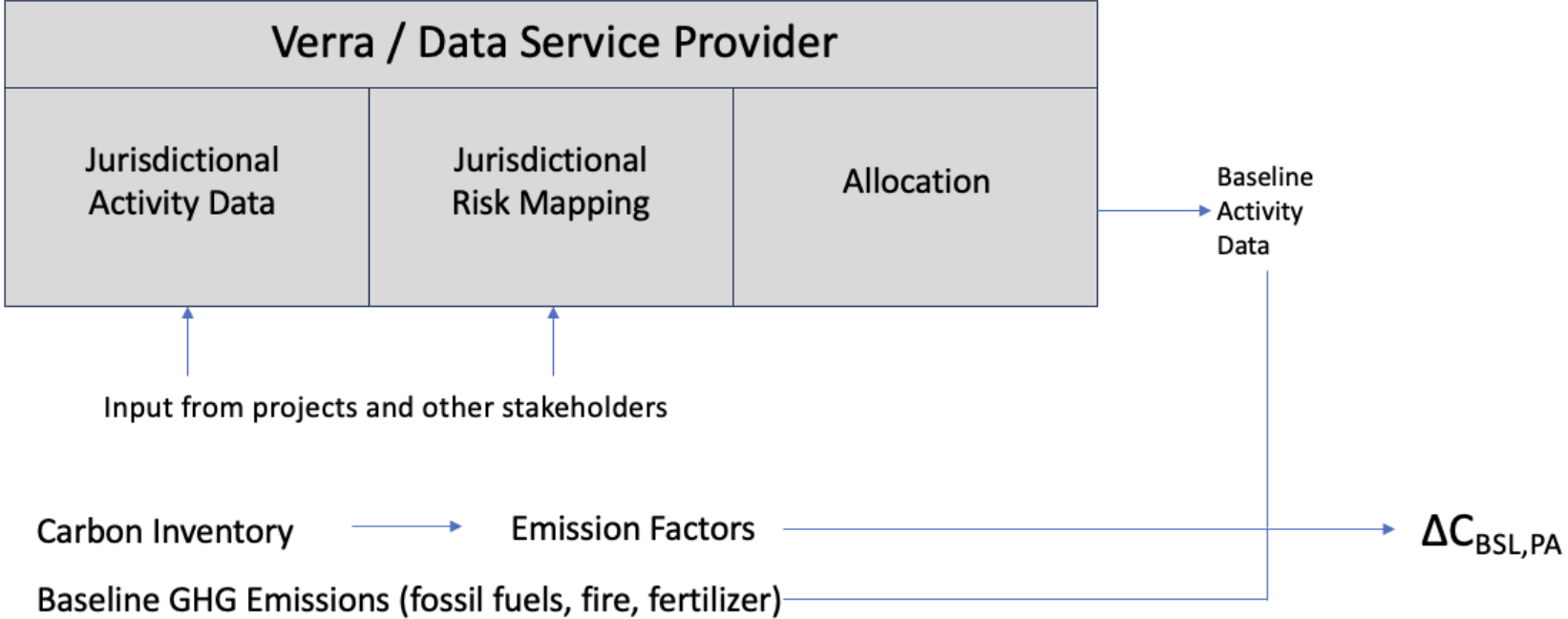
- **Boundaries:**
  - Jurisdiction, leakage belt and baseline validity period determined by Verra
- **Applicability:**
  - No planned deforestation, no tidal wetlands or peatlands
- **Baseline:**
  - Standardized activity data, risk mapping and allocation across a jurisdiction conducted by Verra. Activity data discounted for uncertainty.
  - Emission factors developed by project proponent. Emission factors discounted for uncertainty
- **Monitoring:**
  - Project proponent collects activity data across PA and LB using sampled approach. AD inflated for uncertainty
- **Leakage:**
  - Leakage belt monitoring by project proponent
  - Deductions for leakage outside the leakage belt (important determination of immigrant proportion –  $PROP_{MIG}$ )

# Uncertainty

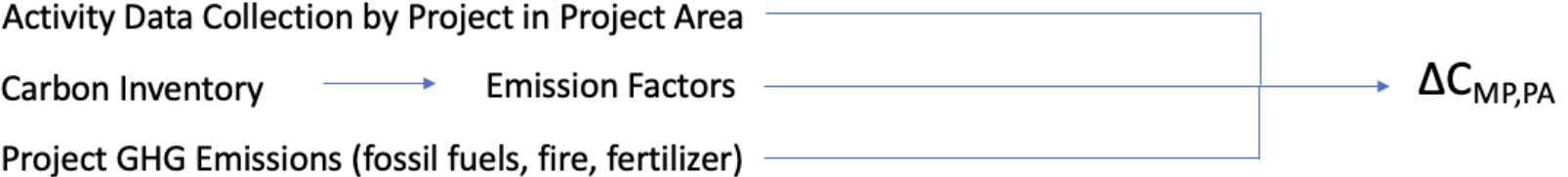
- Handled through discounting of both activity data and emission factors rather than estimation of total offset uncertainty as in some existing REDD methodologies (typically only applied to emission factors)
- For activity data baseline deforestation is conservatively discounted (lowered), while in the monitoring case deforestation is conservatively inflated (raised)
- Approach is the same as in the JNR and builds on a published approach (*Neeff 2020. What is the risk of overestimating emission reductions from forests – and what can be done about it? Climatic Change 166: 26*)



# Baseline:



# Project:





## Leakage:

### Leakage Belt:

Activity Data Collection by Project in Leakage Belt

Carbon Inventory

Emission Factors

Leakage GHG Emissions (fossil fuels, fire, fertilizer)

$\Delta C_{LK, LB}$

### Outside Leakage Belt:

Outside Leakage Belt Emission Factor ( $\Delta C_{OLB}$ )

from *Verra / Data Service Provider*

Migrant Proportion  
( $Prop_{MIG}$ )

x

$AD_{BSL, PA} - AD_{MP, PA}$

$\Delta C_{LK, OLB}$

$\Delta C_{LK}$

### Market Effects Leakage:

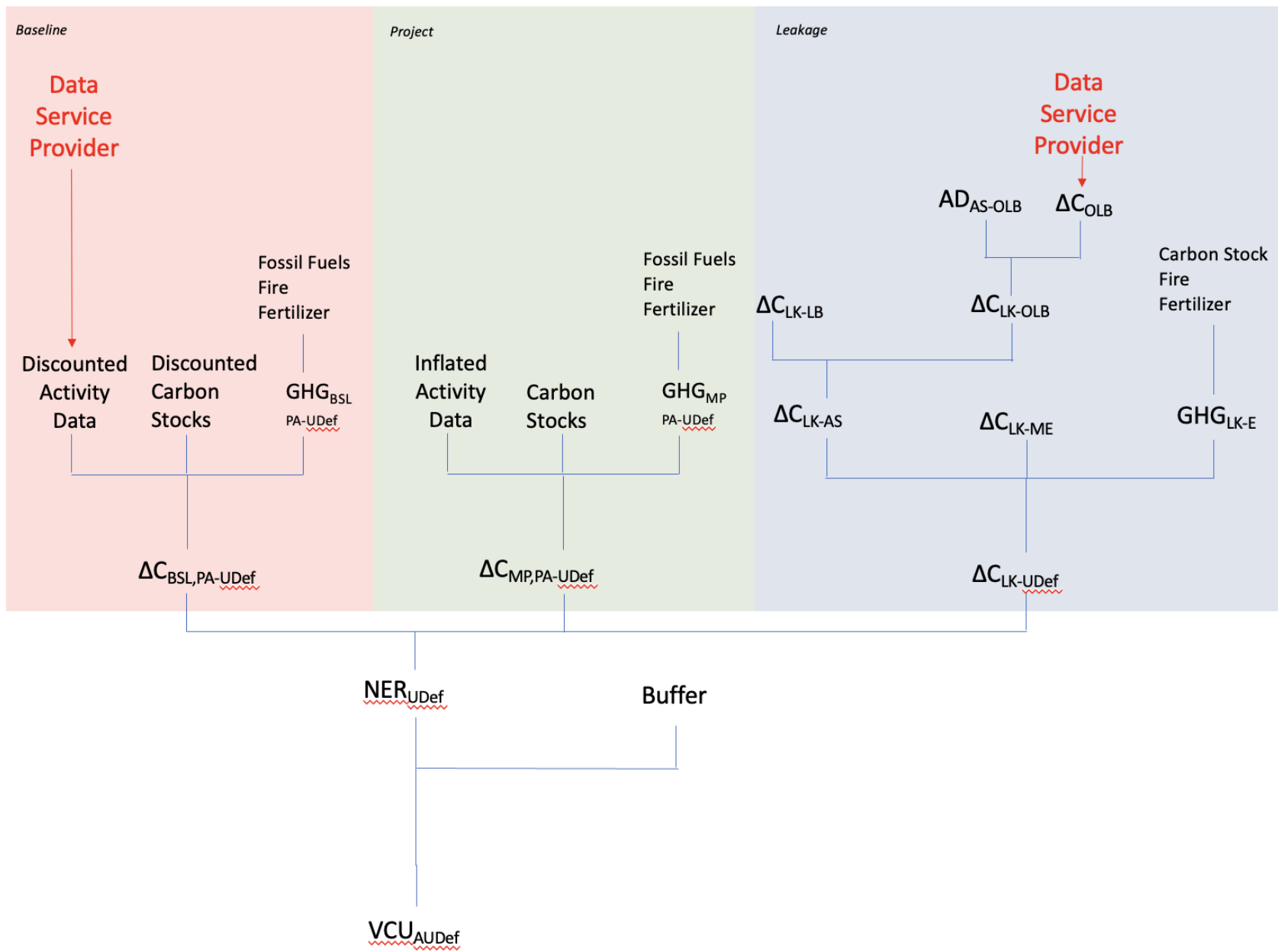
From existing module **VMD0011**

$\Delta C_{LK, ME}$

### Greenhouse Gases from Leakage Mitigation Activities:

Change in carbon stocks, fire and fertilizer use

$GHG_{LK, E}$



# Module overview

	Activity Data	Emission Factors	Net Emissions
Baseline	Verra (Appendix 1)	PP (5.3.2)	PP (5.3.2)
Project Emissions	PP (5.3.3)	PP (5.3.2)	PP (5.3.3)
Leakage	LB	PP (5.3.3)	PP (5.3.4)
	OLB	PP (5.3.4)	Verra (Appendix 2)

# Activity data

- Area of deforestation monitored for two purposes:
  - Over the historical reference period within the jurisdiction, informs baseline validity period AD
  - Over the monitoring period for project, informs monitored project emissions
- A “sample based approach” is utilized in both cases, where sample plots are interpreted against a high resolution imagery time series
- Conservative discounts (for jurisdiction AD baseline) and inflation (for project monitoring) factors are calculated based on uncertainty of deforestation sample
- In both cases, certain areas maybe be mapped as ‘identified exclusions’ and effectively removed from AD accounting (natural disasters, planned deforestation, bodies of water, commercial plantations, etc.)
- Sampling stratification is required for only the project case, but will likely be employed in the jurisdiction as well

# Jurisdictional vs. project AD estimation: major steps

STEP	Jurisdiction	Avoided Unplanned Deforestation Project
Define Sampling frame	Jurisdiction	AUDef project area + leakage belt
Delineate Identified exclusions	Since start of historical period; >1000ha	Since start of monitoring period; >100ha
Generate Sampling Strategy	Any representative approach allowed	Stratified sampling required
Interpret sample plots	Four main LCC categories: Stable Forest, Deforestation, Forest Regrowth, Stable Non-forest	Unplanned deforestation only
Estimate uncertainty	Uncertainty cannot exceed 20% of the estimate	No upper limit on uncertainty
Uncertainty discounting	Uncertainty over 10% results in discounting of AD	Uncertainty over 10% results in inflation of AD
Calculate AD	Single AD estimate for jurisdiction	AD reported separately for each project forest stratum and for project area & leakage belt

# Jurisdictional vs. project AD estimation: Other distinctions

	Jurisdiction	UDef Project
Use	Informs jurisdictional AD over baseline validity period	Calculate project monitoring period emissions
Who does	Data service provider	Project proponent
When, over what period	Prior to start of each baseline validity period, over historical reference period (previous ~10 years)	At each project monitoring event, over previous monitoring period
Exclusions from sampling frame	Intertidal zone; commercial plantations; natural disturbances; planned infrastructure; planned deforestation; permanent water	Everything from jurisdiction + natural disturbances; planned deforestation (>100ha) observed during monitoring period
Stratification	Not required, but advantageous to be based on observed land cover change (e.g. stratify with a land cover change map)	Required for: 1) project forest strata, 2) accounting area (PA vs LB), and 3) minimum of three strata defined by expected frequency of observing deforestation



# ***VMID0055* AUDef Module**

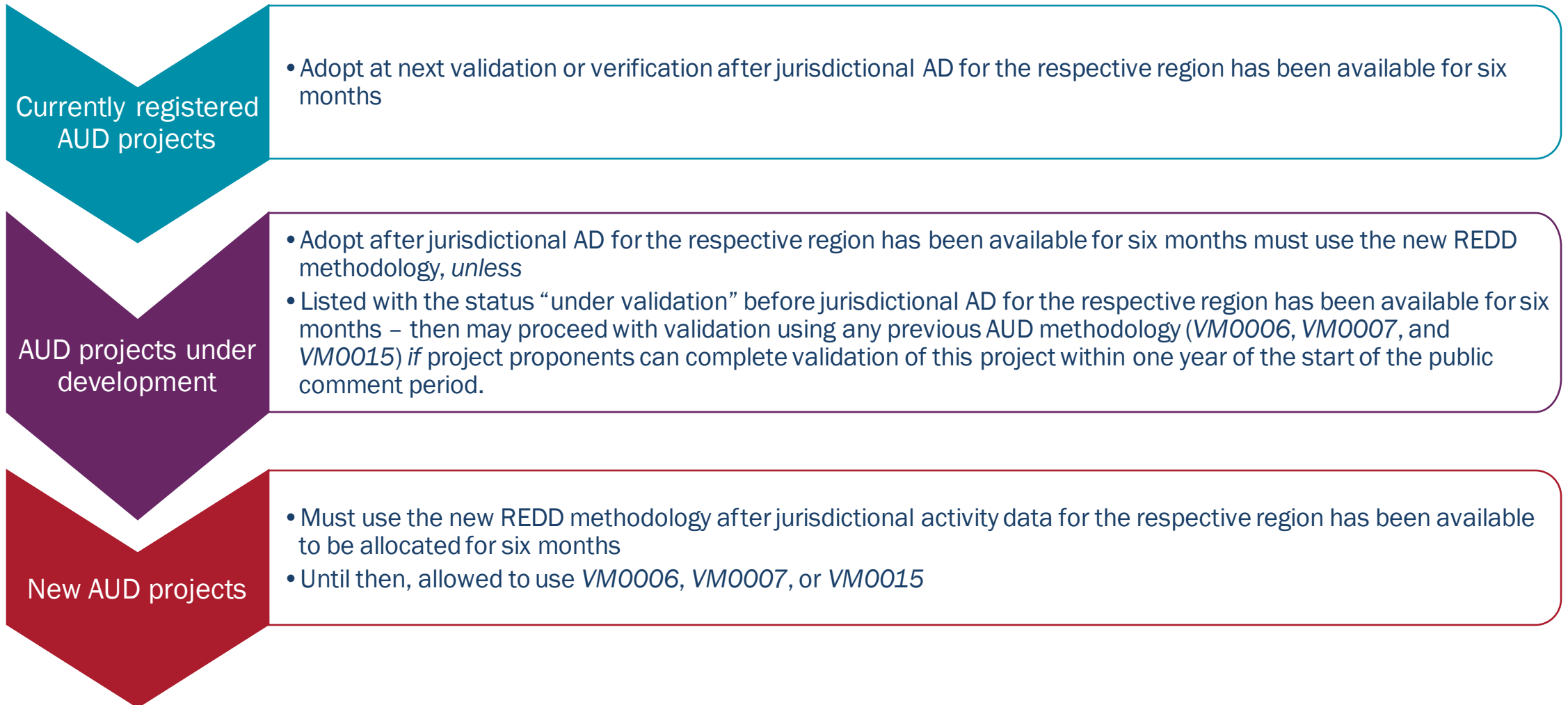
Questions



# Next Steps



# Transition to VM0048 & VMD0055



# Status of AD Development and Risk Mapping

## AD collection completed/close to completion (Phase 1)

- Acre State, Amapá State, Amazonas State, Pará State Rondônia State, Brazil
- Mai-Ndombe Province, Democratic Republic of Congo
- Cambodia, Colombia, Kenya, Tanzania, Zambia, Zimbabwe

## AD collection currently being contracted (Phase 2+)

- All other jurisdictions

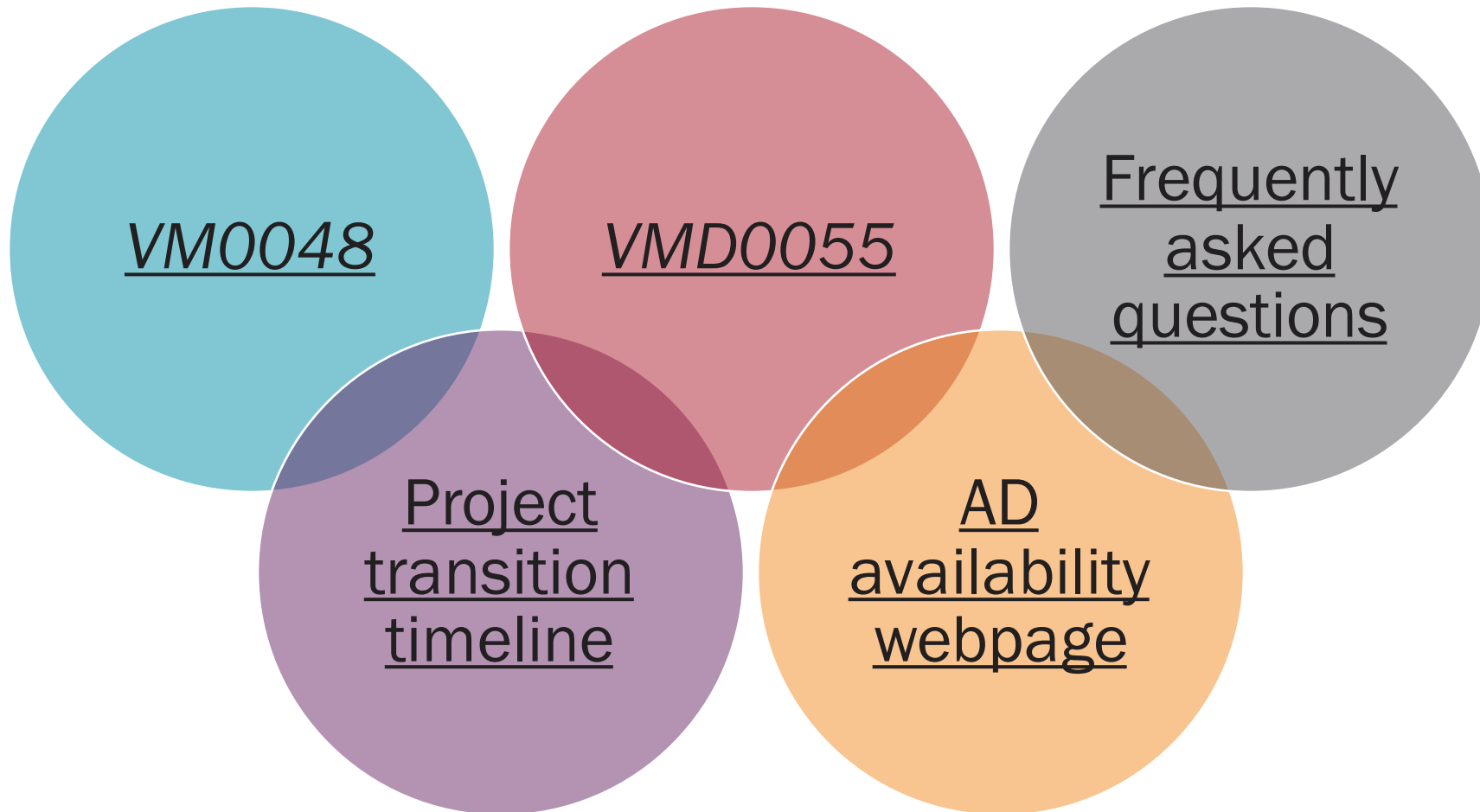
## Data available to allocate

- Phase 1: mid-2024
- Phase 2+: end 2024/early 2025

# Coming soon

- *VT0007 Unplanned Deforestation Allocation Tool (UDef-AT) – Q1 2024*
- True-up mechanism: option to re-assess prior periods using VM0048
- Alignment of Jurisdictional & Nested REDD+ with VM0048
- Development of Avoiding Planned Deforestation module
- Exploration of viability of forest degradation activities
- Revision to [VM0033, Methodology for Tidal Wetland and Seagrass Restoration](#)
- Development of [tropical peatlands methodology](#)

# Key resources



# THANK YOU

Thank you for your rich contributions to the living world. Questions related to this webinar can be directed to [forestcarbon@verra.org](mailto:forestcarbon@verra.org)

