LANDSCAPE GHG ACCOUNTING GUIDANCE

Developing landscape-scale carbon projects

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This publication builds upon and contributes to the 4 Returns Framework and is the result of a close collaboration between Commonland, the Landscape Finance Lab and Wetlands International. The 4 Returns Framework is a practical landscape approach that can be used by stakeholders to undertake long-term, large scale holistic landscape restoration. The landscape approach focuses on generating a full range of benefits for all landscape stakeholders in the form of inspirational, natural, social, and economic returns. The 4 Returns landscape approach can be used as a foundation for developing high-quality nature-based carbon credits projects at landscape scale, to de-risk investments and to achieve holistic impact.

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Executive summary

In order to help address climate change and ensure both nature and people are resilient, we must find pathways to protect and restore nature at scale. Wetland ecosystems – as natural buffers between rising seas and life on land, as well as significant natural carbon stores – are of particular importance. Initiatives such as the 4Returns Framework provide guidance to groups that wish to recognise the interconnectivity between ecosystems and people, and implement integrated land management and ecosystem restoration with a landscape approach.

Given the positive climate impact that such nature-based solutions deliver, there is the potential for climate finance to invest in landscape-scale projects. However, the complexity associated with developing carbon projects at a landscape scale has been a major barrier to investment and implementation.

To help overcome this barrier, this brief provides project developers with pragmatic guidance regarding how to implement one of the voluntary carbon standards, the Verified Carbon Standard (VCS), at a landscape level, focusing on the greenhouse gas accounting component.

A critical decision when developing a carbon project for a landscape-scale initiative is whether to include multiple activities within a single project document (PD) (Option 1) or to create multiple PDs for different activities within a landscape (Option 2). Given that landscape-scale initiatives need to be developed under a single, holistic vision and strategy, Option 1 may be the preferable option. However, under the context of a VCS carbon project, there are a few key considerations when deciding which of these approaches will work best for the specific landscape, including:

Project ownership: VCS projects must establish clear legal ownership of the carbon rights and establish project proponents who have control and responsibility over the project. In some cases, there may be different legal owners of carbon rights across ecosystems, or organizations may control various aspects of a landscape-scale initiative.

Project costs and investment: Different ecosystems, activities, and carbon credit types (e.g., emission reductions vs. removals) may attract different levels of investment interest or credit price. Splitting various activities into separate PDs could attract higher levels of investment or higher credit prices for more attractive activities. However, combining multiple activities in a single PD can reduce transaction costs and help activities with a lower GHG impact be feasible to develop as part of a carbon project.

Timing: The VCS Program has specific requirements and deadlines related to the defined project start date (e.g. the pipeline listing deadline, validation deadline, and timeframe for baseline reassessment) and crediting period. Activities also deliver GHG impacts, and thus finance at different timescales. When different activities across a landscape have significantly different start dates or implementation timelines, it could impact financial flows.

Ecosystem connectivity: Including multiple ecosystems and activities within one PD may make it simpler to develop a holistic theory of change across the landscape and allow for quantifying GHG impacts across multiple ecosystems within the carbon accounting framework. Connectivity is vital for wetland ecosystems that are linked to neighbouring systems by water, or that may migrate inland due to sea-level rise in the case of coastal wetlands.

Although many components of a VCS project must be developed individually for each activity and/or ecosystem included within a single project, there may be some key efficiencies for carbon projects in landscape-scale initiatives (following either of the options set out above), including:

1. Similarity in data types or analysis needed for setting baseline scenarios and/or monitoring
2. Reduced leakage due to the management of adjacent ecosystems
3. Taking ecosystem connectivity (ecological, economic, and social connectivity) into account in the development of a theory of change and approach to carbon benefit quantification
4. More comprehensive stakeholder engagement and view of community impacts and benefits.

Landscape-scale projects have the potential to safeguard nature by preserving the ecological connectivity between different ecosystems, and maximise the social and financial returns of sustainable resource management. By understanding how each component of a VCS project can be conceptualised at a landscape scale, project developers can leverage the inherent integrated framework of a landscape-scale project to maximise both the efficiency and level of investment of any climate finance component.

Picture 1 Mangroves in Senegal, Photograph by Joeri Borst

1. Acronyms

ACoGS	Avoided conversion of grasslands and shrublands
AFOLU	Agriculture, forestry and other land use
ALM	Agricultural land management
ARR	Afforestation, reforestation and revegetation
APDD	Avoided planned deforestation and degradation
APWD	Avoided planned wetland degradation
AUDD	Avoided unplanned deforestation and degradation
AUWD	Avoided unplanned wetland degradation
CCB	The Climate, Community and Biodiversity standard
CDM	Clean Development Mechanism
CIW	Conservation of intact wetlands
FPIC	Free, prior and informed consent
FREL	Forest Reference Emission Level
GHG	Greenhouse gas
IFM	Improved forest management
ILM	Integrated land management
IPCC	Intergovernmental Panel on Climate Change
IPLCs	Indigenous Peoples and local communities
JNR	Jurisdictional and nested REDD+
LtPF	Logged to protection forest (a VCS IFM category)
PD	Project description
REDD	Reducing emissions from deforestation and forest degradation
RWE	Restoring wetland ecosystems
SD VISta	The Sustainable Development Verified Impact Standard
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
VVB	Validation/verification body
WRC	Wetlands conservation and restoration

2. Introduction

Urgent action at scale is needed to address the combined challenges of climate change and ecosystem degradation. Healthy ecosystems – particularly wetlands - store vast amounts of carbon in their soils and biomass but can become a source of emissions upon degradation. Wetlands also buffer climate change and enhance resilience of vulnerable local communities. Integrated landscape and resource management can optimize ecosystem functioning for climate change mitigation as well as sustainable development. Wetlands International, Conservation International and their partners, including Commonland and the Landscape Finance Lab, aim to accelerate landscape recovery so that nature and people thrive.

Individual ecosystems – for instance mangroves, terrestrial forests or grasslands – do not function in isolation and are inherently linked to adjacent ecosystems and their land uses. It is imperative that conservation and restoration initiatives address this ecological and functional connectivity. Anthropogenic threats are also often not bound by ecosystem. For instance, if one forest system is being over-exploited and conservation measures are put in place to protect this forest, unless the underlying drivers of forest loss are addressed, it is likely that those overexploiting the forest will simply move to an adjacent forest system. To prevent this migration of overexploitation, known as leakage in vernacular of carbon initiatives, projects must look at the factors driving and affecting people across landscapes, not simply within one ecosystem or land use. Such holistic, landscape-scale initiatives result in the greatest impact, both ecologically and socially. Moving to the coastline, areas where seagrasses are being lost due to water pollution from upstream agricultural activity is another example of where a landscape-scale vision and strategy is necessary.

Picture 2: High Andean Wetlands, Photograph by Romain Baigun

Despite the potential for nature-based solutions to deliver emission reductions, removals and adaptation to contribute to the goals of the Paris Agreement, investment has so far been limited. One of the major barriers to investment and implementation at scale is the complexity associated with developing carbon projects, especially those that operate at landscape scales that are required to effectively address the drivers of ecosystem degradation and to restore multiple ecosystems.

This brief serves as a living document to provide practitioners with pragmatic guidance regarding how to implement one of the voluntary carbon market standards, the [Verified Carbon Standard (VCS),](#) at a landscape level, focusing on the greenhouse gas accounting component. It includes:

1. A concise overview of the major steps in the life cycle of a VCS project
2. A decision tree to guide project developers through the process of selecting the optimal VCS methodologies for their various landscape components
3. For each component of a VCS methodology, an overview of what is required and what can be done to make the process of implementing a landscape-scale VCS project easier

Whilst other carbon standards certainly exist, the VCS is currently the dominant standard on the voluntary carbon market[1] and also covers the widest array of ecosystems and land uses, making it suitable for landscape-scale initiatives.

This guidance document may be updated in the future if/when there are any updates to the VCS Program that facilitate landscape-scale carbon projects or to provide more practical guidance on how landscape initiatives may be able to meet the VCS requirements.

2.1 Relevant other initiatives

The concept of landscape-scale conservation or restoration initiatives is not new[2]. However, in recent years several approaches and initiatives that incorporate a carbon or climate component have been developed.

The 4Returns framework developed by Commonland and partners is a practical framework that aims to help stakeholders achieve four returns, by following five process steps (the 5 landscape elements), within a multifunctional landscape (the 3 zones). This transformative approach takes place over a realistic time period (minimum 20 years). See Figure 1.

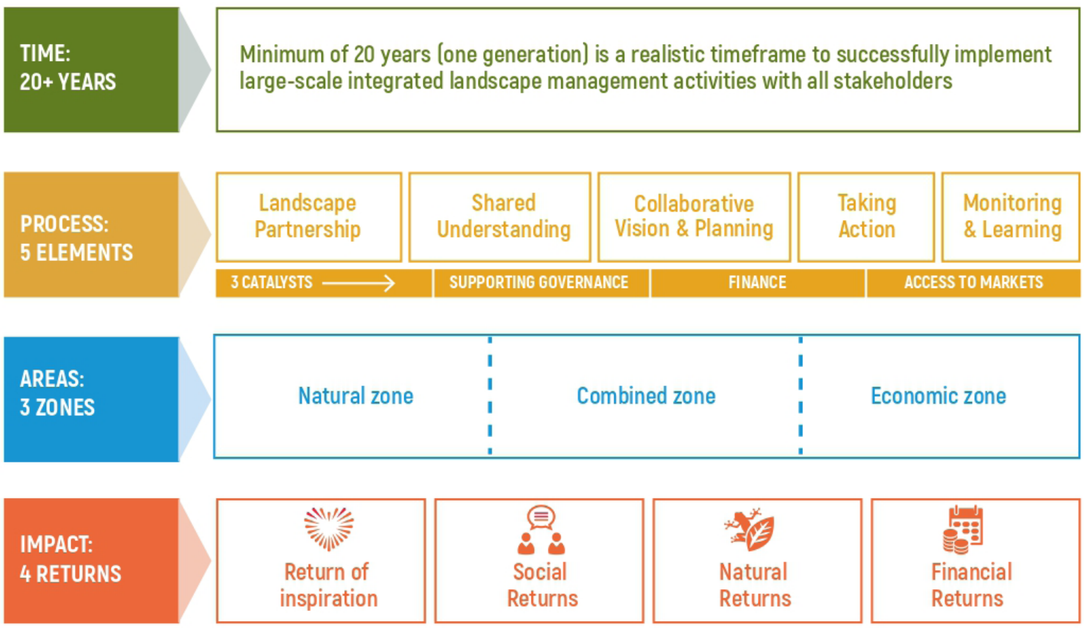


Figure 1: The 4 Returns Framework

Source: The Little Sustainable Landscape Book, GCP, WWF, IDH, EcoAgricultural Partners, TNC (2015);

4 Returns, 3 Zones, 20 Years, IUCN CEM, RSM (2015)

1 Credits issued by the VCS represented 76% of all credits traded on the voluntary carbon market in 2021 (Ecosystem Marketplace, 2022)

2 Donaldson et al., 2017

When calculating the monetary value of landscape restoration, the idea is to not only assess pure financial returns but to also assign values to inspirational, social and natural returns. In doing so, the current economic model of landscape degradation that focuses on maximising financial return on investment per hectare only, can transition into a new norm built around maximising 4 Returns per landscape instead.

Working together with KPMG to develop the 4 Returns valuation method, Commonland identified nine key impacts and converted them into either cash flows or risk reduction (lower discount rate)[3] . Carbon sequestration is one of the impact value components for the natural capital return. The generational timeframe of the 4 Returns approach also aligns well with nature-based VCS carbon projects, which are required to be a minimum of 20 years in length.

This document provides guidance to groups interested in implementing the 4 Returns framework regarding the scale of the carbon sequestration component of their natural capital. To support this, various elements of the framework are referenced throughout this guidance document.

Another relevant initiative is LandScale. Co-led by Conservation International and the Rainforest Alliance, LandScale is an assessment framework using a digital platform that enables landscape-scale initiatives to measure, monitor and transparently report on sustainability outcomes. It is aimed at landscapes that are large enough to capture linkages between different sustainability issues but small enough for results to inform interventions – typically at least 100,000 ha. Underpinning LandScale is an assessment framework providing a holistic set of performance indicators that can be tailored to a landscape. These indicators cover ecosystems, governance, human well-being and production. Nature-based sinks and sources of greenhouse gases (GHGs) are included in the 'ecosystems' indicators.

The broad steps of a LandScale assessment are like those of a VCS project (see Section 3 below): define boundaries; select indicators and metrics; collect data and assess metrics; report and publish results. Also analogous to carbon project registries, LandScale users can choose to have their results validated by the LandScale team and publish the assessment on the digital platform. However, it must be noted that employing Landscale does not enable a project to generate certified carbon offsets. If this is a requirement of the project, the VCS Program should be used. Landscale is preferable when a more holistic assessment of outcomes is desired. Project developers who choose to include a greenhouse gas indicator in their tailored Landscale assessment framework can use this guidance document to support this process.

2.2 Hypothetical case study landscape

To help define the scope of this guidance document, a hypothetical case study landscape (Figure 2) was developed together with key stakeholders[4]. The landscape was designed to incorporate all habitats and land uses that the stakeholders' initiatives cover, as well as the three 'zones' of the 4 Returns framework:

Economic zone: Urban areas, infrastructure. Delivering high and sustainable economic productivity. Monocultures are also part of the economic zone.
Combined zone: Restoring biodiversity and soil through regenerative agriculture and agroforestry, delivering sustainable landscape productivity.
Natural zone: Restoring the ecological foundation and biodiversity.

It should be noted that the ecosystems and land uses are not unique to each zone, with some overlapping multiple zones. This point is of particular relevance to the project boundary definition process (see Section 5.1 below).

3 KPMG and Commonland, 2020

4 Stakeholders consulted in the creation of this guidance document and its annexes included representatives from Wetlands International, Conservation International, Commonland, the Landscape Finance Lab, TerraCarbon and Verra.

Such a landscape could incorporate one or more carbon projects within its ecosystems and activities. Section 3 of this document provides an overview of the stages of carbon project development and implementation under the VCS Program, and Sections 4 and 5 provide guidance regarding GHG accounting for landscape-scale projects under the VCS Program.

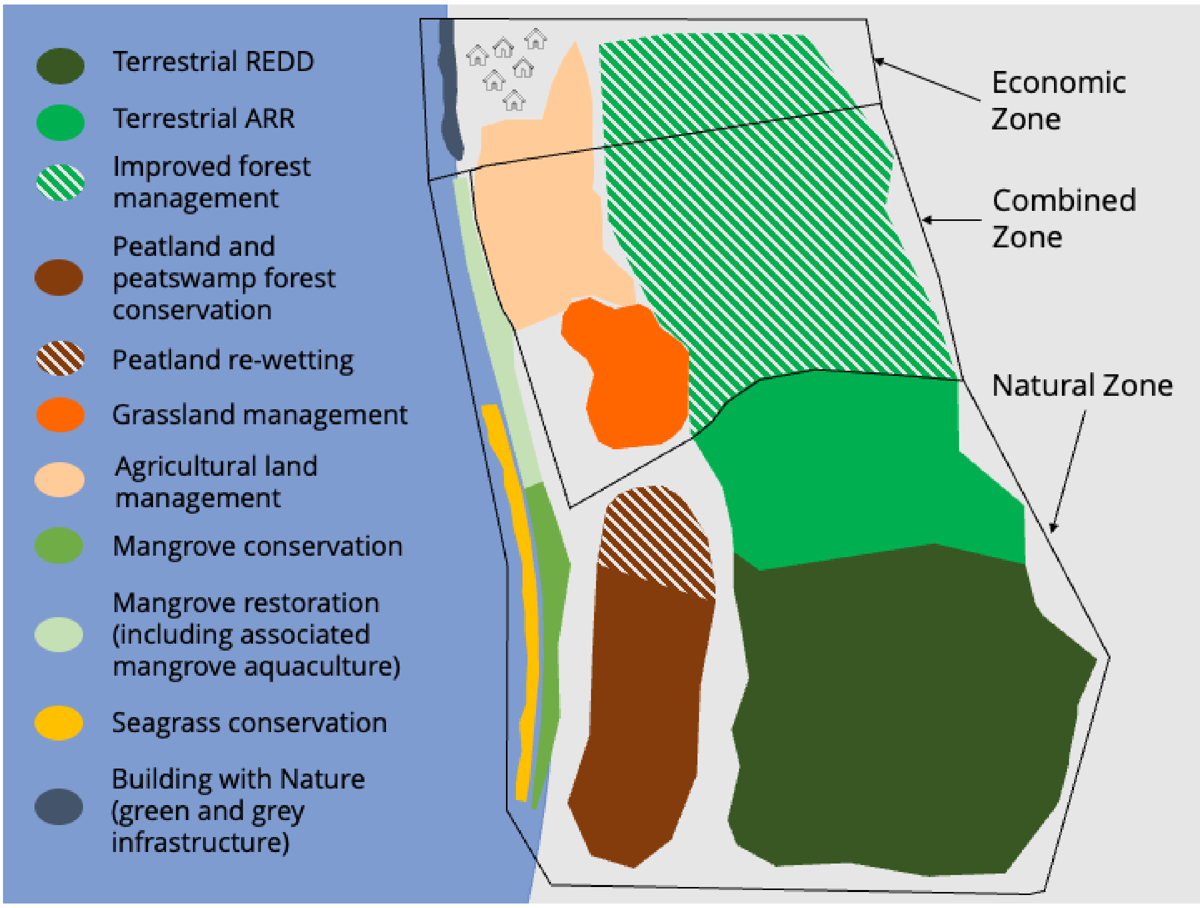


Figure 2 The hypothetical case study landscape used as a reference through the development of this guidance document. It was developed following consultations with key stakeholders. REDD = reducing emissions from deforestation and forest degradation. ARR = afforestation, reforestation and revegetation

4 Stakeholders consulted in the creation of this guidance document and its annexes included representatives from Wetlands International, Conservation International, Commonland, the Landscape Finance Lab, TerraCarbon and Verra.

3. Overview of the key stages of a VCS carbon project

There are six broad stages in the process of developing and implementing a VCS carbon project. These stages are relevant to projects of any scale:

i) Feasibility assessment
In this stage, the viability of the project is defined through an initial assessment of many of the project components detailed in Section 5, together with an initial assessment of how many GHG emission reductions and/or removals the project may generate.

GHG emission reductions can result from the conservation of natural ecosystems, by conserving carbon stocks and preventing GHGs such as CO_2 being released to the atmosphere, e.g. through forest fire prevention or rewetting of drained peatlands. The restoration of natural ecosystems can lead both to the removal of GHGs from the atmosphere through sequestration in vegetation and, in the case of wetlands restoration, can also lead to emission reductions from soil or peat. Every **tonne of CO_2 equivalent** (tCO_2e) that a project prevents being emitted to the atmosphere or removes from the atmosphere can be issued as a Verified Carbon Unit (VCU), if the reduction or removal can be quantified, monitored and verified by an independent third party in line with the VCS Program rules and requirements (see stage v below). These VCUs can then be sold on the voluntary carbon market and the funds raised from these sales used to cover project costs. Thus, the number of VCUs that a project can potentially generate, together with the projected overall costs of implementation and any potential additional funding streams, are critical components in the assessment of the project's financial viability.

For the feasibility assessment, it is also important to assess project boundaries, baseline and project scenarios, and potential leakage (see Section 5 for more information about these components), as well as potential risks. To support this process, all stakeholders involved with or affected by the project must be identified and consulted with, and legal/land tenure assessment needs to be completed.

Picture 3: Measuring carbon in palm swamp forests on peat, Photograph by Kristell Hergoualc'h

The VCS Program is managed by the non-profit organisation **Verra** and underpinned by a suite of documents, including an overarching **Standard document**[5], which sets out all specific requirements for developing projects and for the validation, monitoring and verification of projects and their GHG emission reductions and removals. Also central to the VCS Program are **methodologies**, which set out detailed procedures for quantifying the GHG benefits of a project, and provide guidance to help project developers determine project boundaries, set baselines, assess additionality and ultimately quantify the GHG emissions that are reduced or removed. Thus, these methodologies are a critical tool in all stages of project development. Section 4 of this document provides detailed guidance regarding how to choose the most appropriate methodology, depending on the planned project's scope.

It is common for projects to complete their feasibility assessment in two stages: pre-feasibility and full feasibility. The pre-feasibility assessment covers all elements but through a 'light-touch approach', with the purpose of assessing the basic viability of a project, potentially with the goal of attracting up-front financial investment, ahead of completing a more comprehensive feasibility assessment. Section 5 of this document provides some top-level guidance regarding how to complete a pre-feasibility assessment of a landscape-scale project.

Given the need for strong stakeholder engagement, the full feasibility assessment can in part contribute to the initial stages of project design and development (stage ii below).

ii) Project design and development

During this stage, project developers work collaboratively with all stakeholders potentially involved or affected by the project – including, but not limited to, relevant government authorities, Indigenous Peoples and local communities (IPs and LCs), businesses and project investors – to design and develop the project activities that will result in GHG emission reductions and/or removals.

A critical component of this stage is gaining **free, prior and informed consent (FPIC)** from all people potentially affected by the project, particularly IPs and LCs. The VCS has recently strengthened their requirements and guidance regarding stakeholder engagement and safeguards (see Sections 3.18 and 3.19 of the **Standard document**), and all projects must engage with stakeholders during project design and implementation. Property rights can only be affected if FPIC is obtained from those concerned, including IPs and LCs and customary rights holders, and a transparent agreement is reached that includes provisions for just and fair compensation. The VCS requires projects to have 'no net harm' and project proponents must identify and mitigate against any potential negative social and ecological impacts.

Collectively, these first two stages correlate with the first three process elements of the 4 Returns framework: 'Landscape partnership', 'shared understanding' and 'collaborative vision & planning'.

iii) Pipeline listing

The first stage in the VCS registration process is listing the project on the VCS pipeline. To list a project as under development (Figure 3, Stage 1), a **listing representation** must be submitted to the Verra Registry along with a draft Project Description (PD) which shall include, at a minimum, the cover page and drafts of Sections 1.1 to 1.18 (except 1.7 "Other Entities" and 1.13 "Project location"), 3.1. and 3.2 of the VCS **Project Description template** (Figure 3). Sections 3.1 and 3.2 of this template reference the VCS methodology(ies) identified during the feasibility assessment.

At this stage, indicative information is sufficient. Verra reviews all documentation to check alignment with the Standard's requirements and, once any comments have been sufficiently addressed, the project will be listed as 'under development' on the Verra Registry.

5 All VCS templates and documents linked are current at the time of writing. The versions of the VCS documents referenced in the creation of this guidance document can be found in Annex Three. The reader is encouraged to check the Verra website to ensure that more recent versions do not exist. The most recent versions listed on the Verra website must be used.

Note that a project can choose to skip the 'under development' pipeline listing stage and proceed straight to listing as 'under validation' (Figure 3, Stage 2). However, AFOLU projects must initiate the pipeline listing process within three years of the project start date. The advantages of pipeline listing include increased visibility to potential investors and proceeding with project development with the confidence that the project is aligned with the VCS requirements.

iv) Validation

Once the project has collated enough information to fully complete the PD, the validation process can begin. Verra uses the validation process to ensure that the project abides by all the relevant rules of the Standard. The validation is conducted by a **Validation/ Verification Body (VVB)**, which needs to be contracted by the project before the validation process can start. VVBs are accredited, independent third parties which are approved by Verra to perform validation and verification. Once this has happened, the project must submit the fully completed PD for review by Verra (Figure 2, Stage 2). Once this is complete, the project is listed as 'under validation' and the PD is uploaded to the Verra Registry for a 30-day public consultation. Concurrently, the VVB begins their review of the PD, ahead of visiting the project area to conduct a field audit. A key piece of additional information that the VVB requires immediately is proof of project ownership, such as a legal title to the land (see Section 4.1).

Following their review and field visit, the VVB will provide the project with a validation report and any required corrective actions must be completed. Once the VVB has successfully signed off on the validation report, the project must submit the PD to the Verra Registry along with the **registration** and **validation** representations.

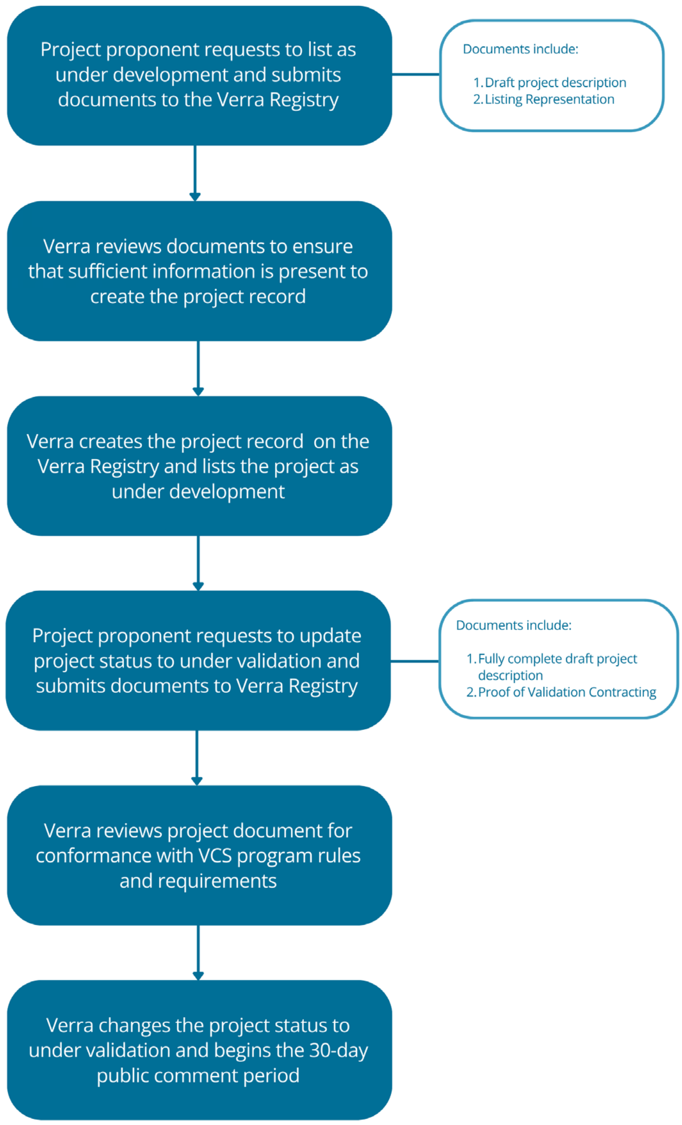


Figure 3 A flow chart, taken from the VCS Registration and Issuance Process document, showing the process of listing a project on the Verra Registry as under development, followed by conversion to under validation. Projects can choose to list as under validation straight away if they have fully completed their PD.

Verra reviews all documentation and raises corrective actions for the project developer and VVB to address. Following final approval from Verra, the project will be listed as 'registered' on the Verra Registry and can proceed with implementation confident that it fulfills the requirements of the VCS Program and applied methodology(ies). It is important to note that no credits are issued at the validation stage. Credit issuance only occurs after verification (see stage vi below).

If a project doesn't depend on investment linked to validation for project development, it can choose to combine the validation and verification process (see stage vi and Figure 4). This can save costs, as VVBs normally charge less for combined validation and verification compared to separate validation and verification.

However, all AFOLU projects must complete validation within five years of the project start date. The only exceptions to this rule are afforestation, reforestation and revegetation (ARR), wetland restoration (RWE) or improved forest management (IFM) projects (see Section 4 for more information on these project categories), or any projects predicted to produce less than 20,000 VCUs per year. These projects have eight years from the project start date in which to commence validation.[6]

v) Project implementation

During this phase, the activities that lead to or support GHG emission reductions and/or removals, defined in stage ii, are implemented. Progress and processes relating to activity implementation need to be systematically recorded, as this information will feed into the monitoring and verification phase.

This stage correlates with the fourth process element of the 4 Returns framework, 'taking action'.

vi) Monitoring and verification

It is only after successful monitoring and verification that VCUs can be issued. Following the requirements of each VCS methodology referenced in the PD, the project must monitor and report on its GHG emission reductions and/or removals.

This is done by completing the most up-to-date version of the Monitoring Report template (Figure 4). A VVB is then contracted by the project to conduct the third-party audit. Once the VVB has successfully signed off on their verification report and any corrective actions have been addressed, the project must upload all documents to the Verra Registry, along with issuance and verification representation. Verra conducts its own review of the project documentation and may raise corrective action requests for the project developer and VVB to address. Following final approval from Verra and payment of the issuance levy, the verified number of VCUs will be deposited into the project's account on the Verra Registry.

It is up to the project how frequently verification is completed but for nature-based projects this monitoring and verification must be conducted at least every 5 years.

This stage correlates with the final process element of the 4 Returns framework, 'monitoring and learning'.

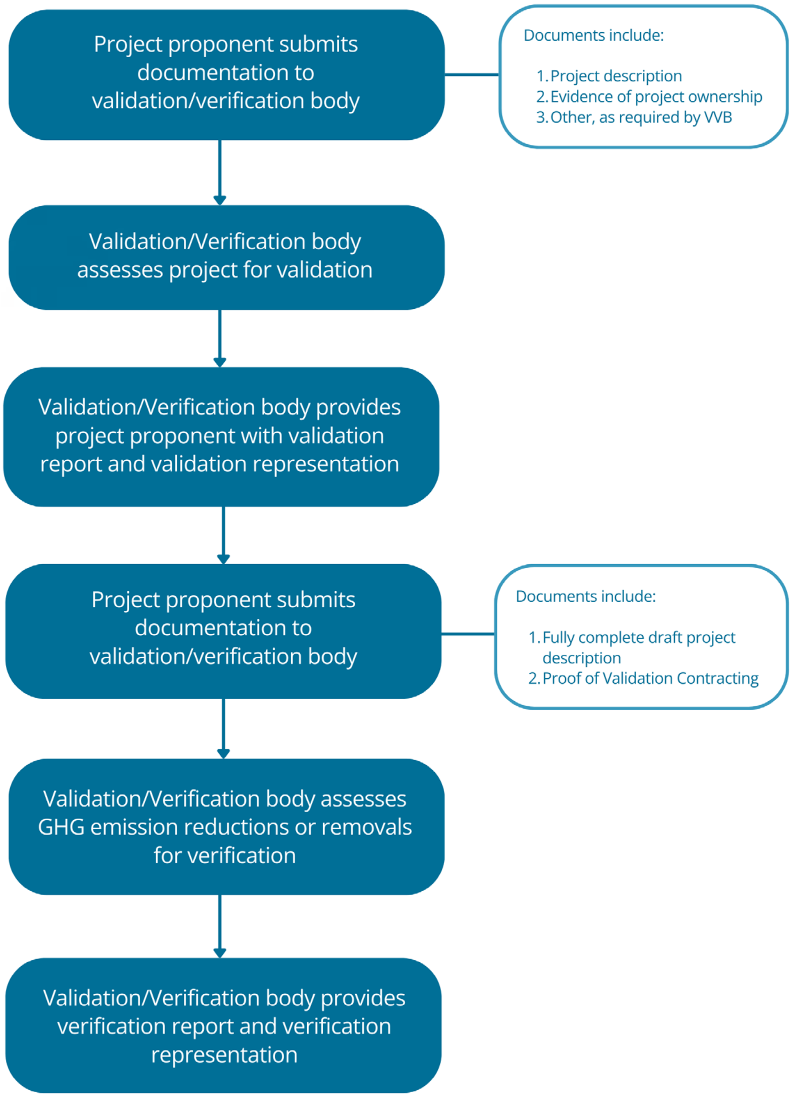


Figure 4 A flow chart, taken from the VCS Registration and Issuance Process document, showing the process of validating and verifying a VCS project.

For more information about this requirement, see section 3.7.3 of the current VCS Standard document (v4.4 at time of writing).

4. Choosing the most appropriate VCS methodology

As explained in Section 3, all VCS projects must use validated methodologies to quantify the GHG benefits resulting from project activities. There are numerous methodologies available to nature-based projects, each covering certain VCS project activity categories, as listed in Table 1. A full explanation of these categories can be found in Annex 1 of the current VCS Standard document.

Project activity category:	**Sub-categories:**
Afforestation, Reforestation and Revegetation (ARR)	ARR
Agricultural Land Management (ALM)	- Improved Cropland Management (ICM) - Improved Grassland Management (IGM) - Cropland and Grassland Land-use Conversions (CGLC)
Improved Forest Management (IFM)	- Reduced Impact Logging (RIL) - Logged to Protected Forest (LtPF) - Extended Rotation Age / Cutting Cycle (ERA) - Low-Productive to High-Productive Forest (LtHP)
Reduced Emissions from Deforestation and Degradation (REDD)	- Avoiding Planned Deforestation (APD) - Avoiding Unplanned Deforestation and/or Degradation (AUDD)
Avoided Conversion of Grasslands and Shrublands (ACoGS)	- Avoiding Planned Conversion (APC) - Avoiding Unplanned Conversion (AUC)
Wetlands Restoration and Conservation (WRC)	- Restoration of Wetland Ecosystems (RWE) - Conservation of Intact Wetlands (CIW), including: - Avoided Unplanned Wetland Degradation (AUWD) - Avoided Planned Wetland Degradation (APWD)

Table 1 The VCS's project activity categories and sub-categories for nature-based (AFOLU) projects. Refer to Annex 1 of the current VCS Standard for the most up-to-date list.

These categories are not necessarily intuitive to someone that has no prior experience with carbon projects and/or the VCS. Furthermore, methodologies all have unique eligibility requirements and often only cover a subsection of activities within each project activity category.

To help address these challenges, a decision tree (see Annex One) has been developed to guide prospective project developers through the process of choosing the most appropriate methodology(ies) for their landscape.

The decision tree has been designed to cover all habitats and land uses in the hypothetical case study and uses a hierarchy that is more intuitive to a project developer. It is grouped around habitat/land uses and then moves to threats that said habitat/land use may be under. From this, the tree leads to potential activities that

a project might implement to address the threats, which are the activities that have the potential to generate GHG emission reductions and/or removals. Each methodology has specific applicability conditions, which define the scenarios to which the methodology can be applied. Some of these applicability conditions are related to the range of activities that a methodology covers, but some are more specific. The decision tree guides the reader through these more specific applicability conditions, leading to the methodology(ies) that is/are applicable to the project. The full versions of all methodologies can be found on the Verra website.
As well as leading the reader to potential methodologies, the decision tree also highlights scenarios where there are currently no applicable methodologies, as well as methodologies that are applicable to multiple habitats or land uses (see the pink arrows at the bottom of the tree). These methodologies can be particularly useful to landscape initiatives that inherently cover multiple habitats and land uses.

To enable readability, the decision tree was designed to be comprehensive but not exhaustive, with footnotes added to highlight important caveats. Once potentially suitable methodologies have been collated, it is imperative that project developers check the specific applicability conditions listed at the start of all methodologies, to ensure they are appropriate for the project's context and planned activities.

Whilst choosing the most appropriate methodology is a critical step in the early stages of project conception, project developers also need to know which project activity category/ies their landscape covers. The VCS has specific requirements for each category, as detailed in the Standard document, which all projects must understand and adhere to. To aid readability, project activity categories were omitted from the main decision tree and a separate diagram has been developed to inform developers on which project activity category/ies their landscape covers. This diagram is also provided in Annex 2 and in tabular format in Table 2.

	VCS Category						
VCS Methodology	***REDD*** (APD, AUDD)	***ARR***	***WRC (CIW: APWD, AUWD)***	***WRC (RWE)***	***ALM (ICM, IGM, CGLC)***	***IFM (RIL, LtPF, ERA, LtHP)***	***ACoGS***
VM0003						x	
VM0005						x	
VM0006	x*						
VM0007	x*	x	x	x			
VM0010						x	
VM0011						x	
VM0012						x	
VM0022					x		
VM0026					x		x
VM0027				x			
VM0032					x		x
VM0033		x		x			
VM0034	x	x				x	
VM0035						x	
VM0036				x			
VM0042					x		
VM0045						x	
VM0047		x					
VM0048	x				x		

**All new avoided unplanned deforestation (AUD) projectds miust use VM0048. Only the avoided planned deforestation (APD) and/or avoided unplanned degradation components of VM0006 and VM0007 remain active.*

Table 2: A table summarising the VCS project activity categories covered by each methodology.

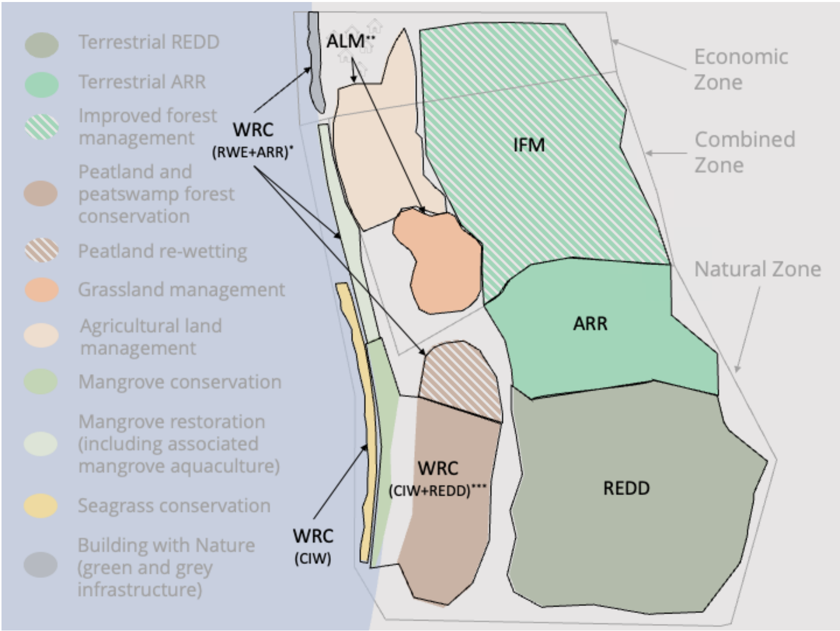


Figure 5 shows the project activity categories that are applicable to the hypothetical case study landscape.Multiple project activities.

* *The Building with Nature component is assumed to include mangroves, thus it is RWE+ARR and not standalone RWE*

** *The activities in the grasslands area are assumed to be focused on improved grazing practices, thus it falls under ALM rather than ACoGS*

*** *The peatland area is REDD as well as CIW because it contains peat forests*

4.1 Multiple project activities

As explained above, except for methodologies like VM0007 and VM0034 (see pink arrows in the decision tree in Annex 1), VCS methodologies commonly only cover one project activity category or sub-category. There is also a concerted move across the VCS towards consolidated methodologies, resulting in only one methodology applicable to each project activity category rather than many methodologies applicable to each project activity category (see Section 5.2.1 for more information). This has decreased the number of methodologies that cover multiple project activity categories.

However, the VCS is designed to be flexible to different project configurations or structures. If no one methodology covers all activities implemented by a landscape-scale initiative, there are two ways in which project developers can apply the VCS to multiple project activities:

1. Applying multiple methodologies within one PD
2. Creating separate PDs for each methodology or certain groups of activities.

When multiple methodologies are utilized in one PD (option 1 above), the geographic extent of the areas to which each methodology is applied must be clearly delineated in the PD. Also, the following criteria and procedures set out in the methodologies must be applied separately to each project activity:

- applicability conditions
- demonstration of additionality
- determination of baseline scenario, and
- GHG emission reduction and removal quantification

The criteria and procedures relating to all other aspects of the methodologies may be combined.

Option 1 has the advantage of creating one VCS project covering the entire landscape. This aligns with the holistic ethos of landscape-scale initiatives and can also be easier to describe to project stakeholders (e.g., donors, community partners) who are familiar with the landscape being described and discussed as a single entity. Option 1 can also be more suitable to projects that include a coastal zone, where sea-level rise will likely impact habitats and land uses (and thus carbon stores as well) over the timeframe of a VCS project. Section 5.1 goes into this in more detail and further examples of situations where option 1 may be preferable are detailed throughout Section 5. Lastly, transaction costs (e.g., the cost of validation and verification) can be cheaper for a singular large project compared to multiple smaller projects over the same area, as the time required by VVBs for assessment and reporting are likely lower.

However, in some situations it may be preferable to separate project activities into multiple PDs (option 2 above). One component to which this is particularly relevant is project ownership. The key entity in any carbon project is the Project Proponent. The VCS defines the Project Proponent as:

The individual or organisation that has overall control and responsibility for the project, or an individual or organization that together with others, each of which is also a project proponent, has overall control or responsibility for the project. The entity(s) that can demonstrate project ownership in respect of the project.

In turn, project ownership is defined as:
The legal right to control and operate the project activities.

Where various areas of a project are controlled by different entities or where multiple entities have control over a single area of land, the VCS allows projects to have multiple proponents. Also of relevance to landscape-scale initiatives that scale over time, particularly grouped projects (see Section 5.1.1), proponents can be added after the initial listing or registration of the project. However, there may be some situations where including multiple proponents within one project may not be feasible, for instance due to commercial, political, funding, or other sensitivities. In these situations, option 2 will be most appropriate. In the context of the 4 Returns framework, where it is not possible to cover the entire landscape vision in one project, it may be logical to create separate projects for each of the three zones (natural, combined and economic), instead of framing project structure solely around project activity categories, given the land ownership and governance characteristics of these three zones may differ significantly. In the case of the hypothetical landscape (Figure 5), this may mean the IFM area being split across two projects. Careful stakeholder analysis is necessary at the early stages of projects to define proponents and thus project structure. The 'shared understanding' element of the 4 Returns framework supports this process.

The interest of potential financial investors is one additional consideration not detailed in Section 5 that can influence project design. Forward selling of carbon credits is one means through which project developers can raise capital to support project start-up. Whilst one VCU is equivalent to 1 tCO_2e regardless of whether it was produced by a CO_2 emission removal project (e.g. reforestation) or an emission avoidance project (e.g. avoided deforestation), carbon credit buyers do not necessarily value them equally. Market data suggests that removals are currently more attractive compared to avoided emissions . Thus, investors may prefer projects that only produce CO_2 removals, or project developers may choose to combine removal and avoidance activities to improve the market appeal of the project, compared to an avoidance only project. How investors influence a landscape-scale project's design will depend on each individual project's need for start-up capital and the range of investors available to them. In the case of terrestrial forests, reducing deforestation and degradation results in avoided emissions and forest restoration results in CO_2 removals. In the case of wetlands however, both reducing conversion and degradation as well as restoration can result in emission reductions, and wetland restoration will result in CO_2 removals. With the release of Version 4.5 of the VCS Standard, Verra has updated the Standard and the methodology requirements to require separate reporting of avoided emissions and CO_2 removals. Whilst this may seem like an additional complication, it will help projects articulate the full climate benefits of their project, in particular, wetland conservation projects that have CO_2 removals as well as sizeable avoided emissions.

7 Ecosystem Marketplace's datahub indicates that in 2021(through August 31), removal credits across all sectors commanded an average price of US$7.98/$tCO_2e$ compared to US$1.71/$tCO_2e$ for avoidance credits. more recent versions do not exist. The most recent versions listed on the Verra website must be used.

5. Landscape guidance for VCS methodology component

This section provides guidance on the conceptualisation and implementation of each of the main sections of a VCS methodology at a landscape-scale.

5.1 Project boundaries

A project's boundary includes the GHG sources, sinks and reservoirs that are controlled by the project proponent, are related to the project or are affected by project activities. Project boundary types that are relevant to GHG accounting under the VCS include geographic boundaries, carbon pools, types of greenhouse gases and temporal boundaries. For projects that include multiple types of activities (e.g., following option 1 set out in Section 4, above), the project boundaries may need to be defined separately for each activity type.

5.1.1 Geographic boundaries

The geographic boundary that is relevant to all initiatives is the project area. This is defined as the area where activities leading to GHG emission reductions or removals will be implemented. The project area must be stratified by project activity category. For non-grouped projects (see below for information about grouped projects), the entire project area should be under the control of the project proponent at the time of validation or must come to be under the control of the project proponent by the first verification event. This flexibility gives large projects like landscape-scale initiatives additional time to secure control, but where less than 80% of the total project area is under control at validation, proponents need to demonstrate that the result of the additionality test (see Section 5.7) is applicable to the entire project area to come under control in the future. Also, the monitoring plan must be designed such that it is flexible enough to deal with changes in the size of the project.

The VCS requires WRC projects in the coastal zone to factor in the impact of sea-level rise on project boundaries. The current version of the VCS AFOLU non-permanence risk tool also requires all projects in the coastal zone to assess the potential risk posed by sea-level rise to project carbon stocks (see Section 5.5 for more information) and it is best practice to conceptualise the impact of sea-level rise across coastal regions. For instance, take the mangrove restoration and agricultural land management areas of the hypothetical case study. Figure 6 illustrates the potential impact of sea-level rise on these areas. As can be seen, the restored mangroves will likely be eroded on their seaward edge but correspondingly expand landwards, as the reach of the maximum high tide extends further inland with rising seas. However, this landward expansion of mangroves is at the expense of the agricultural land, which will likely become too saline for cultivation. This evolution has two potential consequences. Firstly, if the carbon component is split into two separate projects (option 1 in Section 4.1) – one covering the mangrove restoration and one the agricultural land management – the carbon revenue might be negatively impacted. This is because the mangrove restoration project doesn't encompass areas of potential mangrove expansion, thus any CO_2 emissions potentially resulting from the erosion cannot be offset with the CO_2 emissions removed by the new inland mangrove areas. However, if the project covered both areas (option 1 in Section 4.1), there is the flexibility to account for these migrating emissions and removals.

But there is also a human component, in that agricultural land is being lost to sea-level rise. If a landscape initiative conceptualizes such change, it is possible to plan ahead and ensure additional land is available for agricultural production without having a net-negative ecological impact on the landscape as a whole. If this projection is not conceptualized, either agricultural areas will diminish in size, potentially threatening food security, or cultivation will expand inland in an unplanned manner, possibly threatening biodiversity in these areas.

Section 5.5 provides further guidance regarding how to assess the potential impact of sea-level rise on a project.

It should be noted that, where it is not possible to include the entire area expected to be impacted by landward expansion of wetland areas at validation, coastal WRC projects may add land to the project area after the first verification (via a project description deviation) to accommodate wetland migration due to sea-level rise.

It can be challenging for large- or landscape-scale projects to fulfil all the necessary requirements of the VCS Program, particularly those related to ownership, at the time of validation. The level of start-up finances available to a project may also make it favour scaling gradually over time, using the revenue from carbon credit sales to co-finance expansion. In recognition of this, the VCS Program allows for such phased development through its 'grouped projects' mechanism. Verra defines a grouped project as:

A project to which additional instances of the project activity, which meet pre-established eligibility criteria, may be added subsequent to project validation.

In the context of an AFOLU project, an activity instance could for example be a parcel of agricultural land or additional reforestation areas. At the project start date, a grouped project needs to define the full extent of the geographical areas within which project activities may be developed, but it doesn't need to have secured ownership or be at a point where it is implementing and monitoring activities across the whole area.

However, in the initial project documentation the proponent must specify which activities may occur in each geographical area. Critically, it must also be proven that the baseline scenarios – which need to be developed for each designated geographic area – and the results of the additionality tests of the initial project instances are applicable to all areas of the grouped project where these activities may expand to in the future.

Figure 6 Illustration of the potential effect of sea-level rise (SLR) on the agricultural land and mangrove restoration area.

a) Overview, black rectangle outlining insets

b) Current configuration of the agricultural land and the mangrove restoration area

c) Potential future configuration with SLR. Mangroves have been eroded from the seaward edge but have expanded inland, over areas that were previously agricultural land. If the project boundaries of a landscape-scale carbon project don't factor in such future change, agricultural production and carbon revenue may be diminished

Figure 7 illustrates these concepts for a grouped project covering the Combined Zone of the hypothetical case study. Section 5.2 provides guidance regarding baseline scenario assessment and how this process could be streamlined across landscape-scale projects. Some AFOLU methodologies provide specific guidance to grouped projects, others don't mention the concept and one (VM0005) isn't applicable to grouped projects

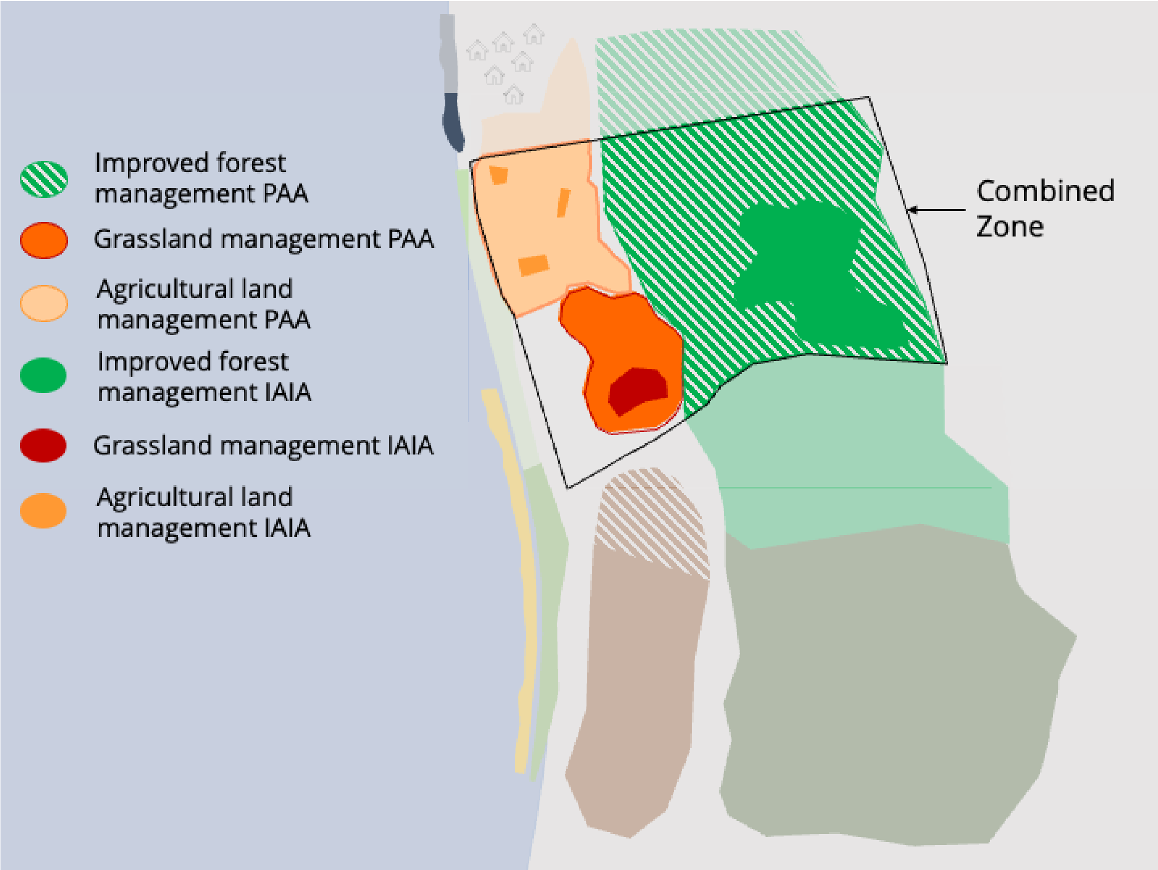


Figure 7 A map of a grouped project implemented over the Combined Zone of the hypothetical case study. The project has defined three geographical areas (project activity areas, PAAs) - one each for grassland management, agricultural land management and improved forest management - where project activities may be implemented in the future. The combination of the PAAs is the project area. The areas covered by the initial activity instances (initial activity instance areas, IAIAs) are (Table 3).

5.1.2 Carbon pools and greenhouse gases

Within the scope of project boundaries, projects need to define from which carbon pools they will generate emission reductions or removals. Depending on the project's activity categories, some pools are mandatory and others are optional or not required, depending on certain factors. Table 4 outlines the mandatory and optional pools for each project activity category.

The methods used to measure and monitor a carbon pool are often similar across different habitats. For instance, the measurement of above-ground tree biomass requires very similar methods across forested habitats, whether they be terrestrial, peatland or mangroves. Meaning that if landscape proponents invest in the technology, equipment and training necessary for these measurements in one habitat, the same tools and skills may be easily scaled and replicated across other habitats. The cost of such replication and scaling can be used to establish whether such economies of scale are relevant to carbon pools across a landscape. Similarly, in the project design stage landscape-scale initiatives can streamline future monitoring requirements by selecting activities that have pools in common.

Regarding gases other than CO_2, reductions of N_2O and/or CH_4 emissions are eligible for crediting if in the baseline scenario the project area would have been subject to livestock grazing, rice cultivation, burning and/or nitrogen fertilisation. Reductions in CH_4 emissions are eligible for crediting if fire would have been used to clear the land in the baseline scenario.

Table 3 outlines the mandatory and optional pools for each project activity category.

Land use	Methodology	Inclusion of guidance for grouped projects
Terrestrial forests (non-wetland)	VM0003	No mention
	VM0005	N
	VM0006	Y
	VM0007	No mention
	VM0010	No mention
	VM0011	No mention
	VM0012	No mention
	VM0034	No mention
	VM0035	No mention
	VM0045	Y
	VM0047	Y
	VM0048	Y*
Peatland	VM0007	No mention
	VM0027	No mention
	VM0036	Y
Mangroves	VM0007	No mention
	VM0033	No mention
Seagrasses	VM0007	No mention
	VM0033	No mention
Tidal Marshes	VM0007	No mention
	VM0033	No mention
Grasslands	VM0022	No mention
	VM0026	No mention
	VM0032	No mention
	VM0042	Y
Agricultural land	VM0022	No mention
	VM0026	No mention
	VM0032	No mention
	VM0042	Y

** Associated module (VMD0055) for estimating emissions from avoided unplanned deforestation (AUD) contains guidance for grouped projects*

Table 3 A table summarising which VCS AFOLU methodologies provide guidance to grouped projects.

		Above ground tree bio-mass	Above ground non-tree* biomass	Below -ground biomass	Litter	Dead Wood	Soil	Wood Prod-ucts
ARR		Y	S	S	S	S	S	O
ALM	Exclusive focus on reducing N_2O, CH_4 and/or fossil-derived CO_2 emissions	S	N	O	N	N	S	O
	All other ALM projects	S	N	O	N	N	Y	O
IFM	Reduced impact Logging (RIL) with no or minimal (<25%) effect on total timber extracted	Y	N	O	N	Y	N	N
	Reduced Impact Logging (RIL) with at least 25% reduction in timber extracted	Y	N	O	N	Y	N	Y
	Logged to Protected Forest (LtPF)	Y	N	O	N	Y	N	Y
	Extended Rotation Age (ERA)	Y	N	O	N	O	N	O
	Low-productive to High-productive Forests (LtHP)	Y	N	O	N	O	O	O
REDD	Planned or unplanned deforestation/ degradation (APD or AUDD) with annual crop as the land cover in the baseline scenario	Y	O	O	N	O	O	S
	Planned or unplanned deforestation/ degradation with pasture grass as the land cover in the baseline scenario	Y	O	O	N	O	N	S
	Planned or unplanned deforestation/ degradation with perennial tree crop as the land cover in the baseline scenario	Y	Y	O	N	O	N	S
ACoGS	Planned or unplanned conversion	O	O	O	O	O	O	N
WRC		Y	O	O	N	O	Y	O

Y: Carbon pool shall be included in the project boundary.

S: Carbon pool shall be included where project activities may significantly reduce the pool, and may be included where baseline activities may significantly reduce the pool, as set out in Sections 3.3.10 to 3.3.28. The methodology shall justify the exclusion or inclusion of the pool in the project boundary.

N: Carbon pool does not have to be included, because it is not subject to significant changes or potential changes are transient in nature. The pool may be included in the project boundary because of positive impacts to reducing or removing emissions. Where the carbon pool is included in the project boundary, methodologies shall establish criteria and procedures to set out when a project proponent may include the pool.

O: Carbon pool is optional and may be excluded from the project boundary. Where the pool is includedin the methodology, the methodology shall establish criteria and procedures to set out when a project proponent shall or may include the pool.

**For ARR, ALM, and AcoGS projects, in place of "Aboveground tree" and "Aboveground non-tree", these two carbon pool categories should be read as "Aboveground woody" and "Aboveground non-woody" respectively.*

Table 4 Table provided by the VCS which outlines the carbon pools that are required or optional for each project activity category

5.1.3 Temporal boundaries

There are two temporal boundaries that are relevant to VCS projects: the project start date and the project crediting period. The project start date is when the activities that lead to verified emission reductions or removals begin. For instance, when forest or wetland restoration starts or when improved agricultural activities begin.

Each PD only has one project start date, which is the initiation of the first activities. However, in a landscape-scale initiative all activities may not have the same start date. This can have implications for project design because the VCS requires AFOLU projects to initiate pipeline listing and complete validation within a certain time period after the start date:
....projects shall initiate the pipeline listing process within three years of the project start date.

All AFOLU projects with ex-ante emission reduction/removal estimates of 20,000 tCO_2e per year or less, and ARR, RWE and IFM (with the exclusion of LtPF) projects of any size shall complete validation within eight years of the project start date.
All other AFOLU projects shall complete validation within five years of the project start date.

This can have implications for the project design of landscape-scale initiatives. Because the project start date and validation deadlines are determined at the project level, there are implications for projects that combine multiple activities that may have different start dates. As an example, take a project with both REDD and ARR activities. The REDD component will produce more than 20,000 tCO_2e per year, thus it needs to be validated within five years of the project start date. The ARR activities would have eight years to complete validation if they were included in a separate PD from the REDD activities, but if they are included within the same PD as the REDD activities they will need to complete validation within five years of the REDD start date. Following a grouped project approach (see Section 5.1.1) may provide some flexibility to projects in this case.

The project crediting period is the time period for which GHG emission reductions or removals generated by the project are eligible for issuance as VCUs. Projects must have a credible and robust plan for managing and implementing the activities that lead to emission reductions or removals over the full duration of the project crediting period.

5.2 Baseline scenario setting and accounting

The baseline scenario describes the activities and accounts for GHG emissions that would occur in the absence of the project. All projects need to predict (ex-ante) baseline emissions and then periodically update their baseline scenario(s). VCS methodologies use one of two methods for establishing crediting baselines: project or standardised performance.

A project method is a methodological approach that uses a project-specific approach for the determination of the crediting baseline.

A standardised performance method establishes performance benchmark metrics for determining the crediting baseline. For instance, projects applying the new **VCS ARR methodology** (VM0047) can use a dynamic performance benchmark – defined as the business-as-usual rate of establishment of new vegetative cover and productivity relative to the project – to both demonstrate additionality and quantify baseline removals. This benchmark is set at each verification based on measurements via remote sensing across a network of representative control plots outside of the project area. IFM methodology VM0045 also uses a dynamic performance benchmark. If feasible and bound by robust procedures, such dynamic, 'real time' estimation of baseline emissions and/or removals can be a more representative way to establish baselines compared to traditional procedures, which ex-ante set the baseline for a certain number of years based on historical observations or measurements. As such, Verra is looking at how dynamic performance benchmarks can be applied to other project activity categories.

Table 5 outlines which of the two methods is used by each methodology and land use in the decision tree.

		Crediting Baseline Method	
			Standardised method
Land use	**Methodology**	**Project**	**Performance**
Terrestrial forests (non-wetland)	***VM0003***	x	
	VM0005	x	
	VM0006	x	
	VM0007	x	
	VM0010	x	
	VM0011	x	
	VM0012	x	
	VM0034	x	
	VM0035	No mention	x
	VM0045	Y	x
	VM0047	Y	x
	VM0048	x	
Peatland	***VM0007***	x	
	VM0027	x	
	VM0036	x	
Mangroves	***VM0007***	x	
	VM0033	x	
Seagrasses	***VM0007***	x	
	VM0033	x	
Tidal Marshes	***VM0007***	x	
	VM0033	x	
Grasslands	***VM0022***		x
	VM0026	x	
	VM0032	x	
	VM0042	x	
Agricultural land	***VM0022***		x
	VM0026	x	
	VM0032	x	
	VM0042	x	

Table 5 A table showing which crediting baseline method each VCS AFOLU methodology employs for each land use in the decision tree.

A performance method is a standardised approach, meaning that clear guidance is provided regarding baseline assessment and no options for alternative approaches. Amongst other benefits, using a methodology which employs a performance method means the verification process is more straightforward. But this doesn't necessarily mean that the methods are easier to implement compared to those that follow a project approach. With the project approach it is left to the project developer to fully define all components of the baseline scenario, following the guidance within the methodology being applied. This flexibility, albeit within the requirements of the Standard, leads to a wide variety of procedures across methodologies that employ a project approach to baseline setting, with some methods being simple to follow and others more complex. Thus, it is impossible to say whether a performance or a project method is more suitable for landscape-scale initiatives and ultimately the approach to set the baseline is determined by the applied methodology(ies). Verra recognizes that the current variation is confusing for both project developers and investors and is already working towards standardisation for some project activity categories, including REDD (see Section 5.2.1). If implemented in a pragmatic fashion, increased standardisation within and across project activity categories would help landscape projects more efficiently assess their baseline scenarios and thus estimate potential net emission reductions and removals more quickly and easily.

For projects that combine multiple project activity categories, a baseline scenario needs to be developed for each activity according to the requirements of the relevant methodology and then reassessed periodically. Avoided unplanned deforestation/degradation projects, whether on terrestrial or wetland areas, or avoided planned deforestation/degradation projects where the deforestation agent is unknown, must reassess and revalidate their baseline every six years. All other AFOLU projects must reassess and revalidate their baseline at least every ten years.

Irrelevant of whether they employ a project or performance method, AFOLU methodologies require a specified combination of three data sources in order to establish and reassess baseline scenarios: remote sensing (e.g., an assessment of historical ecosystem change using a timeseries of classifications derived from satellite imagery), carbon stock inventories and/or social research. For projects with multiple baseline scenarios, it can be advantageous to select methodologies that require similar procedures, to streamline baseline assessment. For instance, by selecting methodologies that lean heavily on remote sensing analysis using satellite imagery, projects can potentially complete one mapping exercise across the entire project area and, using subsets of this analysis, define the baseline scenarios for each project area. However, certain points do need to be considered with this approach. One is the timeframe over which the baselines need to be reassessed. This varies across methodologies and, as detailed above, project activity categories. Such streamlining is only possible when project activity categories have common baseline reassessment deadlines. Another consideration is similarity in the type and availability of data needed for different activities. For example, remote sensing data for deforestation of terrestrial and mangrove forests may be more readily available than loss data for seagrass ecosystems.

Social research is often critical for defining the most likely baseline scenario. Individual ecosystems and the people that rely upon them rarely operate in isolation. Thus, changes in one ecosystem often impact adjacent systems. Social research across a landscape can help project developers understand these links and thus define how baseline scenarios connect across their landscape. This concept aligns closely with the 'shared understanding' process element of the 4 Returns framework.

Picture 4: Livelihoods supported by shellfish farming near mangroves in Senegal, Photograph by Joeri Borst

For instance, Global Mangrove Watch for mangrove ecosystems or Global Forest Watch for other forests.

Regarding quantification of baseline emissions, for the purposes of a pre-feasibility assessment the FAO's EX-ACT tool can be used to estimate both baseline emissions and project emission reductions and/or removals. This tool is well suited to landscape-scale initiatives as it covers a lot of different ecosystems and land use scenarios. Based on the Intergovernmental Panel on Climate Change (IPCC) methodology for GHG emissions inventories, it uses IPCC Tier I values, but with the option for users to input any country/site specific data they may already have. For some ecosystems, global or regional datasets related to aerial change or biomass exist . It is however recommended that projects verify such datasets on the ground before relying on them for anything other than early pre-feasibility. National carbon inventories – for instance the Forest Reference Emission Levels (FRELs) developed under national REDD+ programmes – can also be a useful source of country-specific emission factors. REDD projects in countries or jurisdictions with a FREL that has been validated by the VCS have to use the validated FREL (see Section 5.2.1)

However, for the PD and monitoring reports, projects need to follow the baseline accounting requirements set out in the methodologies they are using. As mentioned in Section 5.1.2, this quantification process can be streamlined across common carbon pools in each landscape. In addition to the IPCC default factors, some methodologies also provide default values for some components, the use of which can greatly decrease the cost of baseline estimation. But these default values are conservative by design. The cost savings from decreased field measurements and monitoring due to the use of IPCC or other default factors need to be carefully weighed against the financial cost of potentially lower net emission reductions and/or removals and thus carbon finance. However, given the costs associated with measurement and monitoring at a landscape level, this trade off can be worthwhile for landscape-scale initiatives and there is also the option of updating and revalidating parameters after the project's initial validation.

5.2.1 REDD and the move towards consolidated methodologies and procedures

Counterfactual baseline scenarios for AUDD projects are a point of contention because the levels of forest loss that would occur in the absence of the project are impossible to verify after the fact (ex-post) and thus are dictated by subjective predictions. Adding to this contention is the fact that, historically, VCS REDD methodologies all employed different procedures through which to calculate this avoided forest loss. One concept that was included in all AUDD methodologies was a reference region, which was used to estimate the rate and (where required) location of deforestation and/or degradation in the baseline scenario. However, how these reference areas were delineated and how historical deforestation was modelled and projected varied depending on the methodology.

In recognition of these issues, together with the fact that their jurisdictional and nested REDD+ (JNR) programme continues to grow and countries increasingly look to implement Article 6 of the Paris Agreement, Verra have released a consolidated REDD methodology (VM0048) together with a module for avoided unplanned deforestation (AUD; VMD0055), which all new AUD projects must now use.

Prior to the release of this methodology, Verra already required VCS projects located within a jurisdiction covered by a jurisdictional REDD+ program to follow the requirements of both the VCS and those related to nested projects set out in their JNR Requirements documents. This includes using any FRELs that have been validated by the VCS.

For AUD projects in jurisdictions that do not have a VCS validated FREL or a JNR programme, Verra has assumed responsibility for determining the baseline deforestation activity data and 'allocating' this baseline deforestation to project areas and leakage belts based on predetermined risk. Third-party data service providers (DSPs) are responsible for the activity data generation and the allocation is done using a risk tool (VT0007), which is also administered by a third-party DSP.

The activity data generation involves a remote sensing analysis of historical forest loss across a whole jurisdiction (country-level for smaller countries; largest administrative unit for larger countries), including any carbon project areas. This revised approach aligns with the JNR procedures and avoids subjectivity related to reference area definition.

However, these procedures for baseline assessment do pose a challenge for landscape-scale initiatives that incorporate a large percentage of a country's or region's forest, or incorporates all areas at high risk of deforestation due to local drivers. This is because the approach outlined above is used for baseline reassessment as well as establishment. For such large projects, if at the point of baseline re-assessment a project has been successful in limiting deforestation, then the deforestation rates measured within the jurisdiction will be diminished. In effect, the project is cancelling its own baseline. This issue is not unique to the new methodology; it was also relevant in many of the prior VCS REDD methodologies. But, with no obvious simple solution in sight, it is an important concept for landscape-scale initiatives to bear in mind.

The issue of varying or outdated methodological procedures are not unique to REDD. In recognition of this, as part of its New Era for Verra initiative, Verra is assessing its existing methodologies and moving towards singular, consolidated methodologies for project activity categories/sub-categories where possible. The new VCS ALM (VM0042) and ARR (VM0047) methodologies are other products of this standardisation and consolidation.

5.3 Project scenario setting and accounting

The project scenario describes the activities that will be implemented by the project and accounts for the GHG emission reductions and/or removals resulting from these activities. It also accounts for any GHG emissions resulting from project activities.

For the purpose of pre-listing and validation, project emission reductions and/or removals need to be predicted (*ex-ante*) using the procedures outlined in the relevant methodologies. For verification (*ex-post*), it is the monitoring results (see Section 5.8) that are used to establish with-project GHG emission reductions and/or removals. The ex-ante estimations are purely for the purpose of validation, but can be useful for securing project investment.

Many of the simplifications outlined in Section 5.2 can also be utilised for the purpose of pre-feasibility assessment and/or with-project accounting, such as default factors and procedures for assessing the impact of sea-level rise on a project area. Regarding ex-ante accounting, if IPCC Tier I values are used for the purposes of baseline quantification, it is recommended that they are also used for project scenario accounting, to ensure that ex-ante estimates are neither overinflated nor underestimated.

All AFOLU methodologies require uncertainty assessments related to baseline and project emissions, which cover all components where uncertainty may be introduced, for instance due to sampling (e.g., carbon stock measurements and remote sensing analyses). If uncertainty rises above a specified threshold, deductions must be made to net emission reductions and/or removals. This has implications for landscape-scale initiatives, where the scale of sampling required to keep uncertainty down may be large. Careful stratification of landscapes based on carbon stock variation and baseline scenarios can help to keep both sampling levels and uncertainty down. Beyond such stratification, projects must weigh up the financial benefits of lower uncertainty deductions (i.e., more carbon credits) against the cost of additional sampling.

Such uncertainty considerations should also be factored in when assessing the viability of using published or national data sources, for instance FRELs in the case of REDD projects in countries without a VCS validated FREL. Such data sources can result in a significant project cost saving, but if their levels of uncertainty are above the methodology's threshold for no deduction such savings might be offset by a sizable uncertainty deduction.

Uncertainty deductions are not relevant to IPCC default factors or default factors provided by methodologies because the lower range of the default factors are used and thus uncertainty is factored into their definition.

5.4 Leakage

Leakage is when, because of a carbon project, emissions increase outside the project area (e.g., due to activities like deforestation moving to a different area). These emissions must be monitored and accounted for, and can negate some or all of the carbon benefits generated by a project. The VCS defines three types of leakage:

- *Activity-shifting leakage* occurs when people conducting activities that cause GHG emissions (e.g., deforestation agents) move to other areas
- *Market leakage* occurs when a project changes the supply and demand equilibrium of commodities (e.g., wood or agricultural products), causing other market actors to shift their activities and seek supply from other areas. Increasing prices resulting from decreased supply can also create incentives for actors outside the project area to begin exploitation, when without the project they wouldn't have.
- *Ecological leakage* occurs when GHG emissions occur outside of the project area because of project activities, due to hydrological connectivity to the project area. This category of leakage is only relevant to WRC projects.

The VCS limits leakage to the increase in GHG emissions that occurs outside the project boundary but within the same country. Thus, if a project covers the entirety of an ecosystem within one country and it can be shown that drivers of GHG emissions will not move to other ecosystems, leakage assessment is not necessary.

Leakage is a complex concept for projects of any scale and mitigating against it is critical for project success, particularly in conservation or agricultural projects. Leakage is of particular relevance to landscape-scale initiatives for two main reasons: its implication on project boundaries and leakage mitigation.

As an example, take the terrestrial REDD, ARR and IFM areas of the hypothetical case study. At the project start date, by definition, the REDD and IFM areas are classed as forest and the ARR area is non-forest. Activity-shifting leakage is commonly monitored and measured in a leakage belt, which is an area that is ecologically similar to the project area and accessible by people causing GHG emissions in the project area prior to the project start date. Therefore, the leakage belt for a standalone REDD project would likely include the IFM area and vice versa. In order to prevent leakage, even if it was decided to only implement a carbon project in the REDD area or the IFM area, leakage prevention activities would be necessary in the other area. If sizable emission reductions result

Picture 5: An aerial shot of Sasthamkotta lake, Kerala, India Photograph by Harsh Ganapathi

from these leakage prevention activities, it may make sense to simply bundle both areas into one carbon project, if the costs of monitoring are not prohibitive and the governance structures allow.

Leakage mitigation activities commonly involve providing alternative, more sustainable livelihoods to deforestation or agricultural agents and ensuring the market demand for products are not negatively impacted. Thus, in the context of the 4 Returns framework, the Combined Zone can be critical for leakage mitigation. One of the major advantages of a landscape approach is that the risk of leakage is reduced because the project is managing/influencing a larger area and thus limiting the potential for leakage from smaller, individual projects.

For grouped landscape projects, leakage assessments, where required, must be undertaken on the initial group of instances of each project activity and reassessed where new instances of the project activity are included in the project.

5.5 Permanence

In the context of carbon projects, permanence relates to how long the GHG emissions removed from the atmosphere or avoided by the project will remain out of the atmosphere. The VCS defines permanence as GHG emissions removed or avoided for at least 100 years.

Because VCUs from AFOLU projects are based on carbon stocks in natural ecosystems which could be lost due to a variety of reasons (e.g., fire, cyclone etc.), it is impossible to fully guarantee their permanence. Therefore, all VCS AFOLU projects are required to conduct a non-permanence risk assessment[9] prior to validation and at each verification. This assessment generates a 'risk rating' which is used to determine how many VCUs a project must deposit into the VCS' AFOLU pooled buffer account. These credits are termed buffer credits. All VCS AFOLU projects that generate VCUs must allocate at least 10% of their credits to the pooled buffer account, which acts as an insurance measure against unexpected GHG emissions from across the VCS AFOLU project portfolio. In the event carbon stocks underpinning verified VCUs are reversed less than 100 years after generation (e.g. because of fire), a corresponding number of buffer credits will be cancelled.

The risk assessment and buffer allocation must be performed separately for each project activity category and, for grouped projects, risk analyses must be conducted for each geographic area specified in the PD.

The risk assessment covers internal (e.g. financial viability), external (e.g. political) and natural (e.g. fire) risks. This spreadsheet enables project developers to easily calculate their risk rating and thus buffer allocation. The minimum risk rating is 12 (with 12% of VCUs allocated to the buffer account) and any project with a risk rating greater than 60 is deemed ineligible for crediting.

In 2023, Verra revised the tool to incorporate projected future climate change impacts, including sea-level rise. The future climate impacts are predicted based on information provided by the IPCC in the contribution of Working Group I (the physical science basis) of the Sixth Assessment Report (AR6) and the 2019 Special Report on the Ocean and Cryosphere in a Changing Climate.

All projects in the coastal zone must assess the risk of sea-level rise. The tool requires the assessment of four factors that are deemed to reflect the relative risk of sea-level rise to carbon stocks: levels of ecosystem degradation; coastal erosion; degree of salinization; and coastal flooding. Estimating the potential extent of coastal flooding due to sea-level rise broadly requires three sets of information: sea-level rise projections; topography and elevation across the project area, including human-made structures; and sediment supply.

For the sea-level rise projections, IPCC regional sea-level rise forecasts are sufficient in the absence of peer-reviewed literature. NASA have developed a useful tool for accessing these forecasts for different climatic projections. Regarding topographic data, for large projects covering largely flat areas, the freely available

9 All projects are now required to complete the non-permanence risk tool via Verra's digital platform, the Verra Project Hub.

10 For instance, Worldview imagery

30-m resolution Shuttle Radar Topography Mission (SRTM) data can be sufficient. However, for project areas with significant coastal topography or micro-topography that has the potential to influence wetland migration, projects are recommended to source higher resolution data, either through field surveys or high-resolution stereo satellite imagery[10].

Regarding sediment supply, that could lead to coastal accretion balancing out sea level rise to some extent, the VM0007 and VM0033 methodologies have guidelines for tidal wetlands. A sediment load of >300 mg per litre has been found to balance high-end IPCC scenarios for sea-level rise and at 250 mg per litre, a sea-level rise of 15 mm is balanced at a tidal range of 1 m or greater.

It should be noted that the internal risk component includes a section on project longevity. Project longevity is the number of years beginning from the project start date that project activities will be maintained, which may be longer than the project crediting period where projects can demonstrate that activities that maintain carbon stocks on which GHG credits have previously been issued will continue beyond the project crediting period. If a project longevity of at least 40 years cannot be proven, the project is ineligible for crediting. However, it should be noted that for grouped projects project longevity is defined at the project level and not based on each individual activity instance, thus each instance does not necessarily need to have a 40-year project longevity. But should an instance leave a grouped project before the end of its 40-year longevity period, the project must either conservatively assume a loss or monitor the instance to detect loss events for the remainder of the 40-year longevity period.

Beyond the purpose of calculating buffer allocation, this tool can be useful at the pre-feasibility stage to objectively assess the relative risk of each component of a landscape. If a certain ecosystem or area is deemed high risk, the project developer may decide to deprioritise it in terms of project area definition.

5.6 Net emission reductions and/or removals

A project's net emission reductions and/or removals (NERs) are calculated according to the requirements of each methodology used. But in simple terms, NERs are derived from the following calculation:

NERs = (BL – P – L) × B

Where:

NERs Net emission reductions and/or removals (tCO_2e)
BL Net baseline emissions (tCO_2e) (see Section 5.2)
P Net project emissions (tCO_2e) (see Section 5.3)
L Leakage emissions (tCO_2e) (see Section 5.4)
B Non-permanence buffer contribution (0.4 – 0.988) (see Section 5.5)

An *ex-ante* estimation of NERs is required for pipeline listing.

The NERs from each project activity can help inform project structure (e.g. single or multiple projects, options 1 and 2 in Section 4.1) and scaling. As an example, take the REDD and ARR areas within the Natural Zone of the hypothetical case study. In the ARR area, trees planted by the project will take time to grow and in the first few years after planting only sequester CO_2 slowly in the biomass. Biomass CO_2 sequestration rates then increase before plateauing once the trees are fully grown. This process leads to an inverted U-shaped carbon income t trend, with low revenue from biomass in ARR areas in early years (Figure 9). Conversely in the REDD area, if project activities can have an immediate limiting effect on deforestation, then carbon revenues can be tangible right from the project start date and continue until the end of the project crediting period (Figure 9). By completing such ex-ante forecasting analyses for each project component, landscape-scale initiatives can use activity phasing and structure to ensure the project is supported by a constant stream of revenue throughout its lifecycle

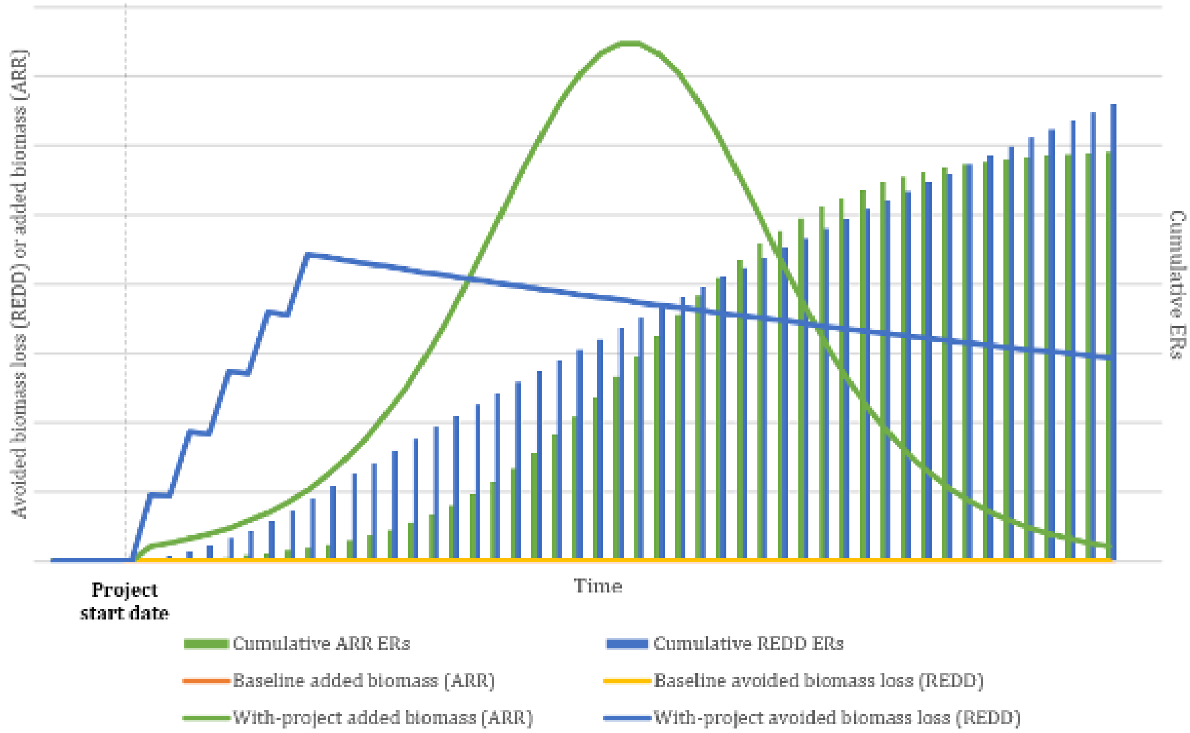


Figure 9 A heavily simplified, hypothetical forecast of ex-ante net emission reduction/removals (NERs) from ARR and REDD project components, illustrating how NERs – and thus carbon credit revenues – accumulate over time for each component. The lines show hypothetical biomass loss (for REDD) and addition (for ARR) trends over time, which equate broadly to ERs. The bars show how these NERs cumulate over time. Zero avoided biomass loss/growth was assumed in the baseline scenarios for both ARR and REDD. For the REDD scenario it was assumed that the project has a gradual impact on deforestation, thus the stepped rise of the with-project avoided biomass loss. As can be seen, despite this stepped impact on deforestation, the REDD component delivers NERs and thus revenue from early on in the project to the project end, whilst the ARR component delivers most in the middle of the project, when biomass growth is at its fastest. Note that this graphic excludes any NERs generated by the soil organic carbon pool, which can be significant in WRC projects. Whilst hypothetical and simplified, this illustrates that REDD NERs can help ensure project viability at the start and end of a project, when ARR NER delivery is lower.

5.7 Additionality

Carbon projects are additional if it can be shown that their GHG emission reductions and/or removals would not have occurred without carbon finance. All VCS projects need to prove additionality.

Many VCS methodologies use a project-specific approach for the determination of additionality, often utilising the VCS' own AFOLU additionality tool. The VCS also allows for the use of two types of standardised methods to assess additionality: performance methods, which establish performance benchmarks for the demonstration of additionality, and activity methods, which pre-determine additionality for given classes of project activities using a positive list. The activity method is generally the simplest for projects to employ, but the list of applicable activities can be restrictive.

The AFOLU and CDM tools broadly follow the same steps of: identification of alternative land use scenarios to the project activities; investment analysis to determine that the proposed project activity is not the most economically or financially attractive of the identified land use scenarios, or a barriers analysis; and common practice analysis. The information gathered through the 'shared understanding' process element of the 4 Returns framework will inform many of these steps and will be critical to assessing additionality.

For projects incorporating multiple activities, the demonstration of additionality needs to be completed separately for each project activity category. However, a single set of criteria and procedures for the demonstration of additionality may be used where the applied methodologies reference the same additionality tool. Table 6 summarizes which additionality method is used by each VCS AFOLU methodology for all land uses in the decision tree.

		Additionally Method		
			Standardised method	
Land use	**Methodology**	**Project**	**Activity**	**Performance**
Terrestrial forests (non-wetland)	VM0003	x (CDM)		
	VM0005	x (VCS IFM)		
	VM0006	x (VCS AFOLU)		
	VM0007	x (VCS AFOLU)		
	VM0010	x (VCS AFOLU)		
	VM0011	x (VCS AFOLU)		
	VM0012	x (VCS AFOLU)		
	VM0034	x		
	VM0035			x
	VM0045			x
	VM0047			x
	VM0048	x (VCS AFOLU)		
Peatland	VM0007	x		
	VM0027	x (VCS AFOLU)		
	VM0036	x (CDM)		
Mangroves	VM0007		x	
	VM0033		x	
Seagrasses	VM0007		x	
	VM0033		x	
Tidal Marshes	VM0007		x	
	VM0033		x	
Grasslands	VM0022			x
	VM0026	x (VCS AFOLU)		
	VM0032	x (VCS AFOLU)		
	VM0042	x		
Agricultural land	VM0022			x
	VM0026	x (VCS AFOLU)		
	VM0032	x (VCS AFOLU)		
	VM0042	x		

Table 6 A table showing which additionality method is used by each VCS AFOLU methodology for each land use in the decision tree.

5.8 Monitoring

Every methodology has different procedures for monitoring the different carbon pools. Projects need to follow the requirements of each methodology they use. Most AFOLU methodologies use a combination of remote sensing and field measurements for monitoring. Landscape projects operating across multiple ecosystems can streamline any remote sensing component of monitoring by defining mapping methodologies that work across all of the project's ecosystems.

Technology has the potential to improve efficiency and lower costs associated with monitoring, for instance by using satellite or airborne (e.g. using drone or light aircraft) measurements of the biomass carbon pool.

However, with the exception of certain cases in the ALM methodology VM0042, all AFOLU VCS methodologies currently require some form of field measurements for verification. To solely use such technology for monitoring would require either a methodology deviation (to be approved by Verra) or the creation of a new methodology. Such revised procedures, within the accuracy requirements of the VCS, have the potential to significantly support the monitoring and reporting process of landscape-scale projects and align closely with the LandScale initiative.

5.9 Additional certification

The previous sections cover all components required by a VCS methodology. However, it is generally seen as best practice for nature-based projects to pursue co-certification under an additional standard, to demonstrate co-benefits and ensure appropriate safeguards are in place for local communities. Such additional standards under the Verra umbrella include the Climate, Community and Biodiversity Standards (CCB) – which is focused on measuring and monitoring social and biodiversity co-benefits – and the Sustainable Development Verified Impact Standard (SD VISta), which focuses on reporting impact against the United Nations' Sustainable Development Goals (SDGs). Both of these standards are managed by Verra and thus the reporting processes have been streamlined, with PD templates specifically designed for co-certified projects. Under the SD VISta program, Verra are also developing a biodiversity-focused Nature Framework asset methodology which, once completed, will enable projects to generate 'Nature credits'.

One of the benefits of landscape-scale projects is that they require stakeholders to understand the ecological, economical and social linkages between different ecosystems. Additional certification also requires projects to go beyond simply understanding, measuring and monitoring the carbon benefits of projects, mirroring the holistic approach of the four impact components of the 4 Returns framework: inspiration, social, nature and financial.

The CCB Standards also places greater emphasis on safeguards compared to the VCS requirements alone. The VCS Program simply requires projects not to negatively impact the natural environment or local communities, whilst CCB projects must demonstrate a net-positive impact on both biodiversity and the wellbeing of local communities.

Picture 5: Demak Indonesia, Photograph by Cinthia Boll

6. Conclusion

The central goal of the Paris Agreement – to keep global temperature rise as close to 1.5°C as possible – is in danger, and only swift, decisive, and scalable action will keep it within reach. Nature is essential for climate mitigation and adaptation, and its conservation and restoration can provide at least 30% of the needed emissions reductions to limit global temperature rise. Within the nature-based solutions, wetlands are critical, delivering emission reductions, removals, and adaptation benefits for people and the planet.

Despite this role, investment in scaling nature conservation and restoration is limited. Financial incentives provided by the voluntary carbon market are a promising strategy. However, reaching scale will require integrated land-use planning which requires combining VCS project categories and methods across different activities and ecosystems. In addition, achieving scale will require removing barriers, including simplifying complex methodologies and developing a pipeline of projects that operate at a sufficient scale. The information included above helps reduce some of the complexity associated with developing carbon projects for landscape-level interventions.

Although landscape-level interventions can be complex to design and develop as carbon projects due to the interconnectivity between ecosystems, they have the potential to result in the greatest impacts ecologically and socially and are a key solution to addressing the climate crisis. Operating at the landscape level and in an integrated way is also key to achieving long term sustainability and the permanence associated with that.

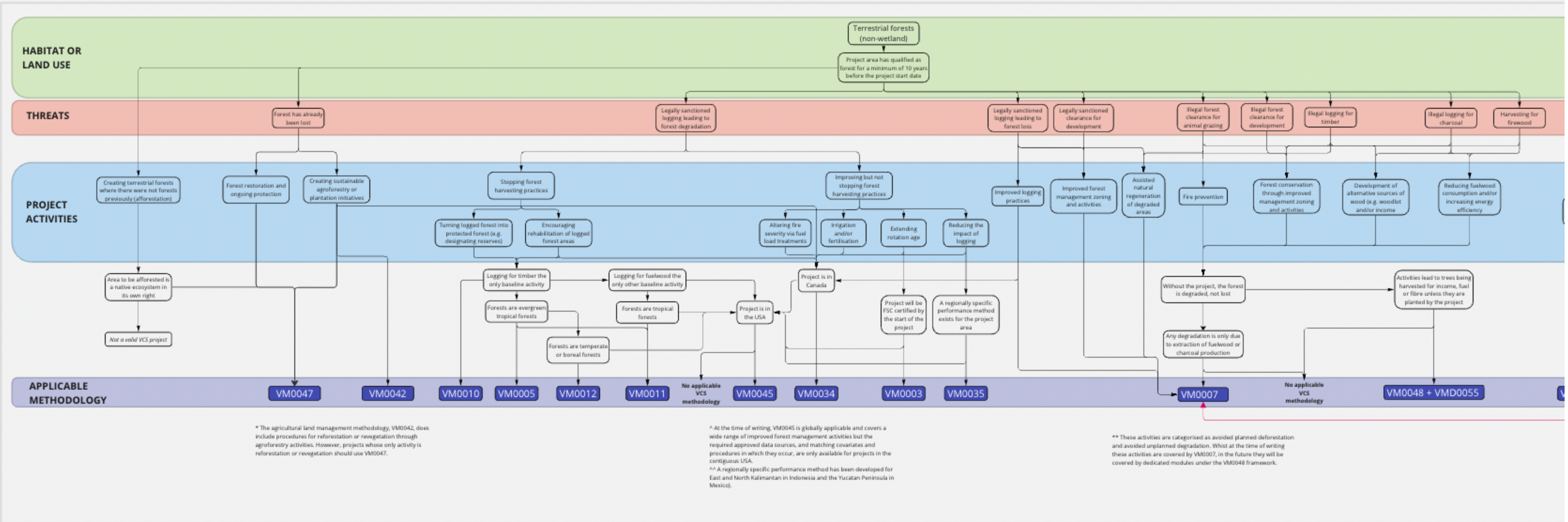
Picture 6: Farming in wetland areas, Photograph by Dennis Jarvis

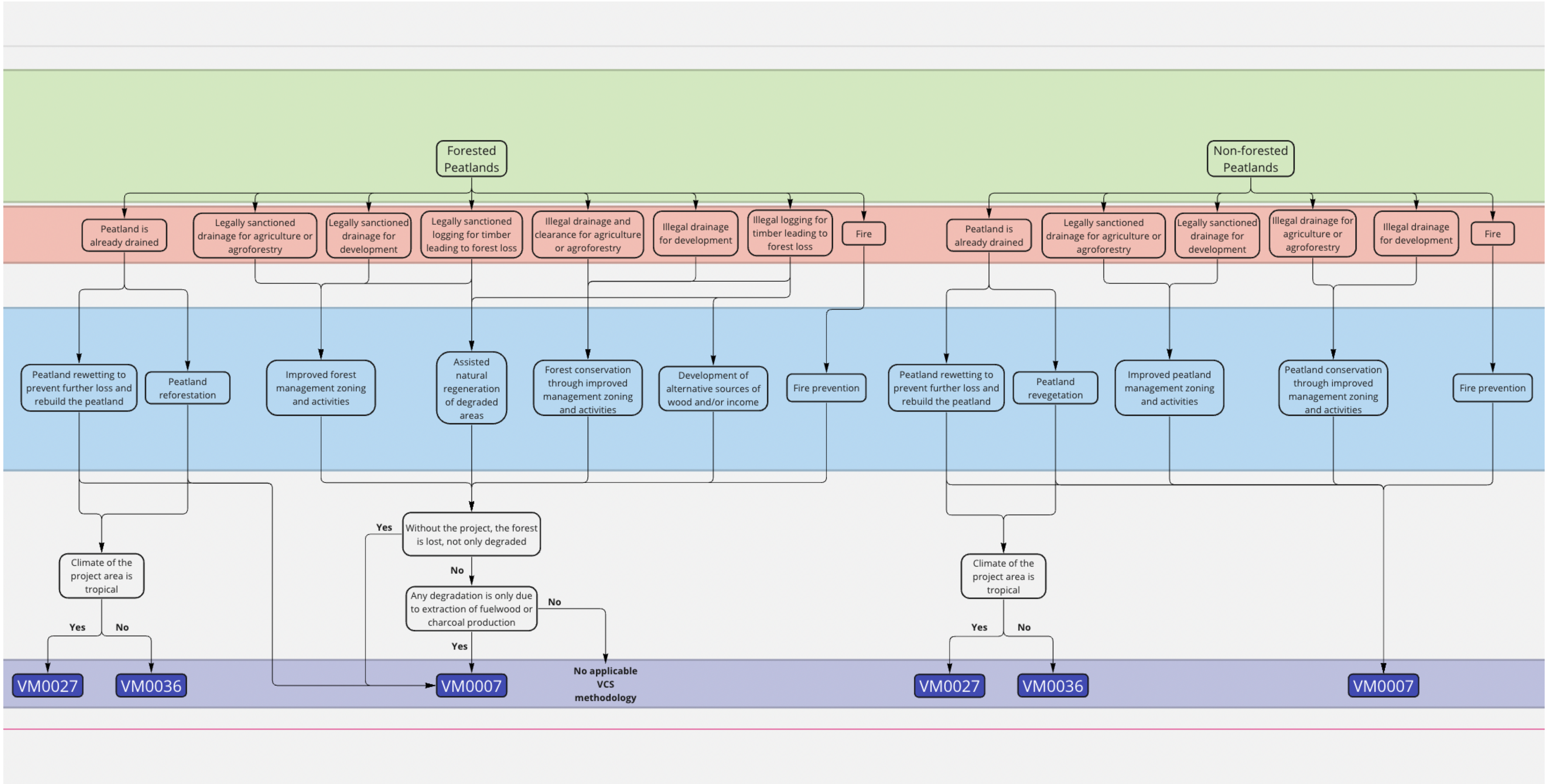
[11] An overview of the theory of change process can be found in Section 5 (Stage 3) of Part 1 of the CCB's Social and Biodiversity Impact Assessment Manual.

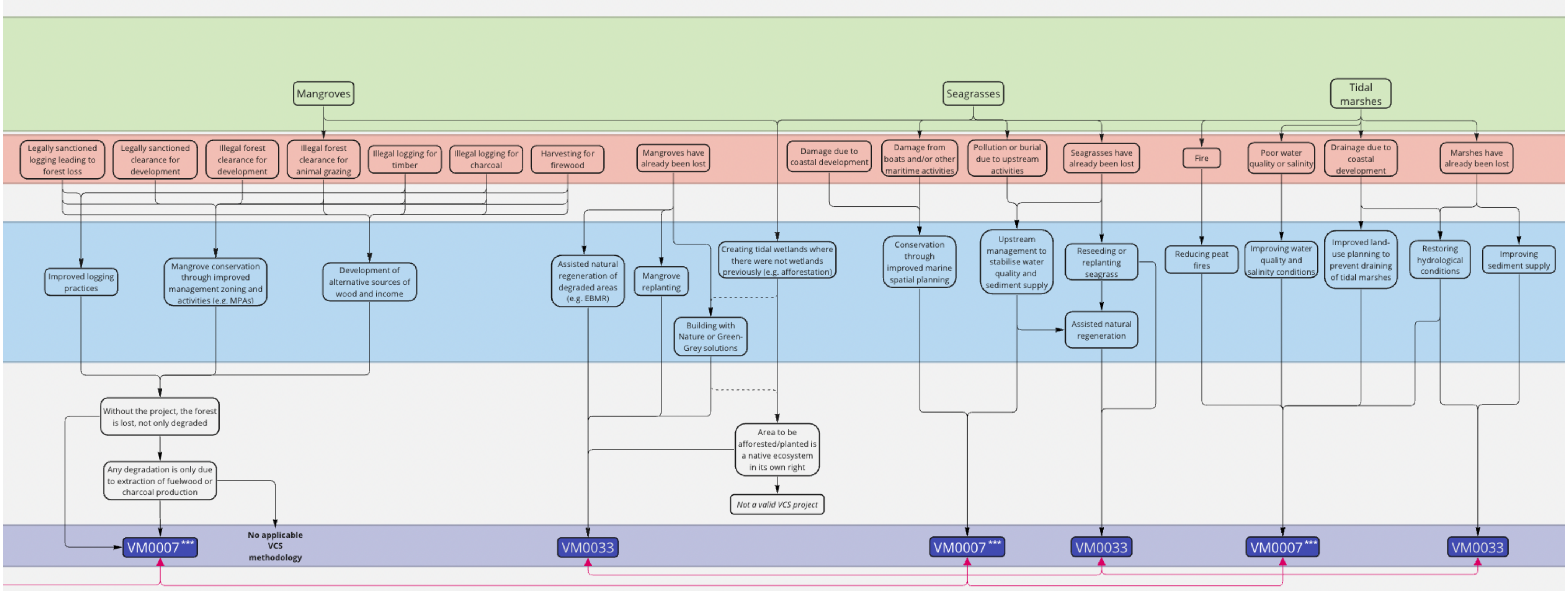
Annex One – Methodology Decision Trees

The [methodology decision tree](), broken down into habitats to improve readability. The full decision tree can also be found in PDF format [here]().

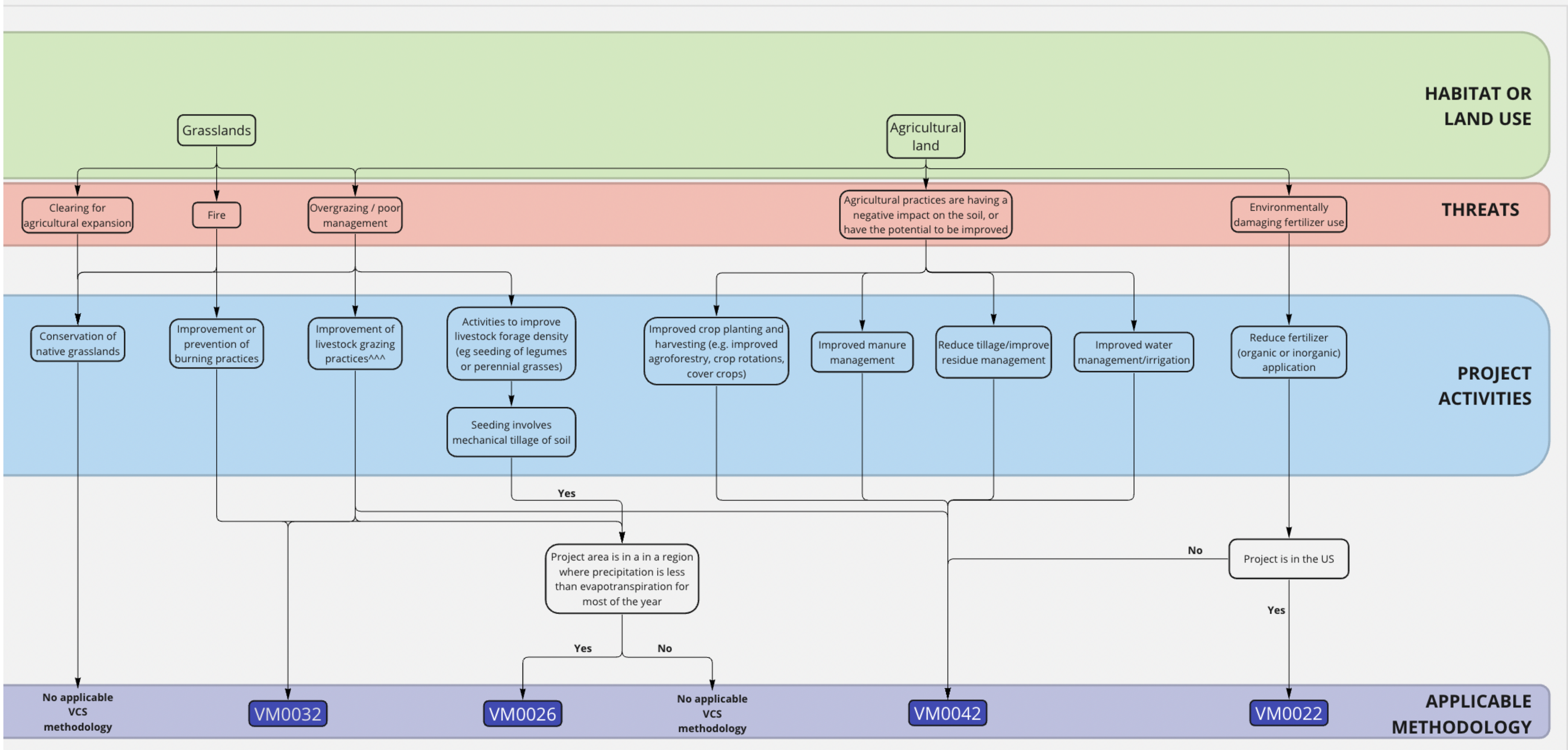
Overview




Forested Peatlands
Non-forested Peatlands
Peatland is already drained
Legally sanctioned drainage for agriculture or agroforestry
Legally sanctioned drainage for development
Legally sanctioned logging for timber leading to forest loss
Illegal drainage and clearance for agriculture or agroforestry
Illegal drainage for development
Illegal logging for timber leading to forest loss
Fire
Peatland is already drained
Legally sanctioned drainage for agriculture or agroforestry
Legally sanctioned drainage for development
Illegal drainage for agriculture or agroforestry
Illegal drainage for development
Fire
Peatland rewetting to prevent further loss and rebuild the peatland
Peatland reforestation
Improved forest management zoning and activities
Assisted natural regeneration of degraded areas
Forest conservation through improved management zoning and activities
Development of alternative sources of wood and/or income
Fire prevention
Peatland rewetting to prevent further loss and rebuild the peatland
Peatland revegetation
Improved peatland management zoning and activities
Peatland conservation through improved management zoning and activities
Fire prevention
Climate of the project area is tropical
Yes
No
Without the project, the forest is lost, not only degraded
Yes
No
Any degradation is only due to extraction of fuelwood or charcoal production
Yes
No
No applicable VCS methodology
Climate of the project area is tropical
Yes
No
VM0027
VM0036
VM0007
VM0027
VM0036
VM0007



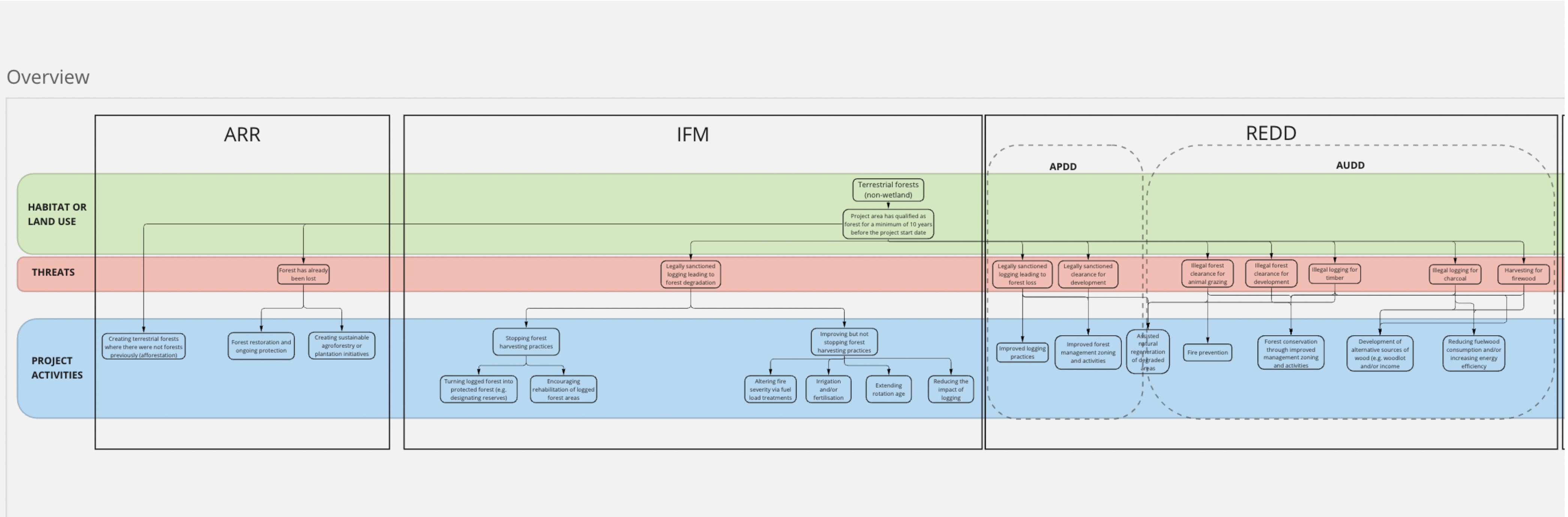
*** The tidal wetland (mangrove, seagrass and saltmarsh) conservation components from VM0007 are in the process of being adapted and migrated to VM0033. The adaptation will bring the avoided unplanned deforestation procedures in-line with the jurisdictional allocation approach of VM0048/WMD0055.
Once this is completed and validated, VM0033 will serve as the sole methodology needed for tidal wetland projects.

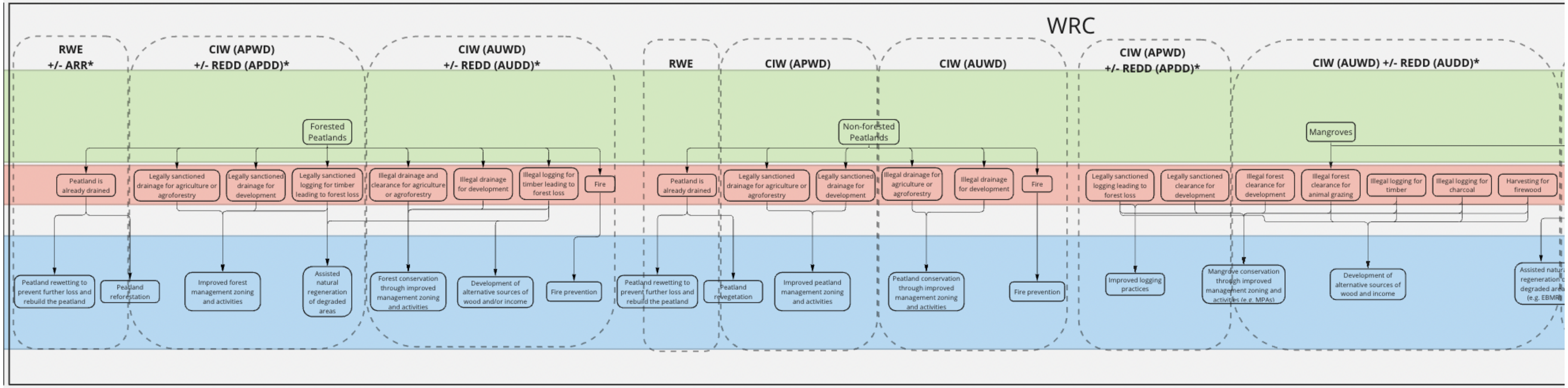


^^^ Reducing emissions from enteric fermentations through feed addition or herd structure is included in this activity and is covered in VM0032 and VM0042.

Annex Two – VCS Activity Category Decision Trees

The VCS project activity categories overlain onto the methodology decision tree. This diagram is also provided in [Miro]() and [PDF format]().





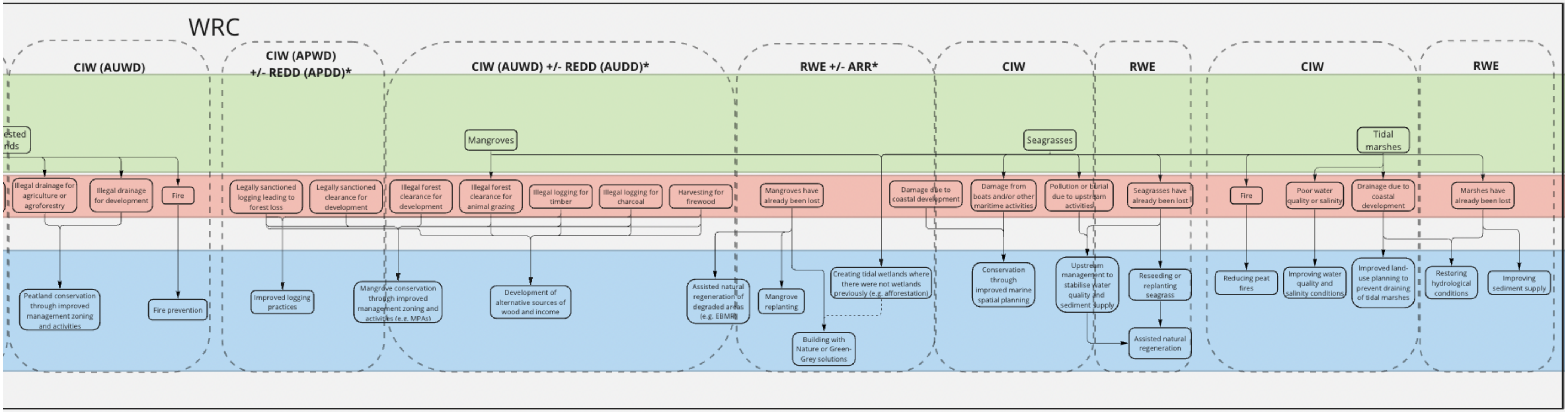
* WRC projects can also encompass VCS's REDD or ARR categories.

For conservation projects, if mangroves are included then it is automatically a REDD project.

In the unlikely scenario that the change in the soil carbon pool due to project activities is insignificantly small (*de minimus*), and thus the project is only required to account for changes in vegetation biomass, mangrove projects can be standalone REDD (in the case of conservation) or ARR (in the case of restoration) projects.

However, in the case of conservation, if both the soil carbon and vegetation biomass pools are significant then the project is CIW+REDD. If this is the case for a restoration project then it is RWE+ARR.

One additional category not fully delineated into this diagram is RWE+REDD. This combination is possible in scenarios where peatland or wetlands are rewetted and this results in significant avoided emissions from the vegetation carbon pool.



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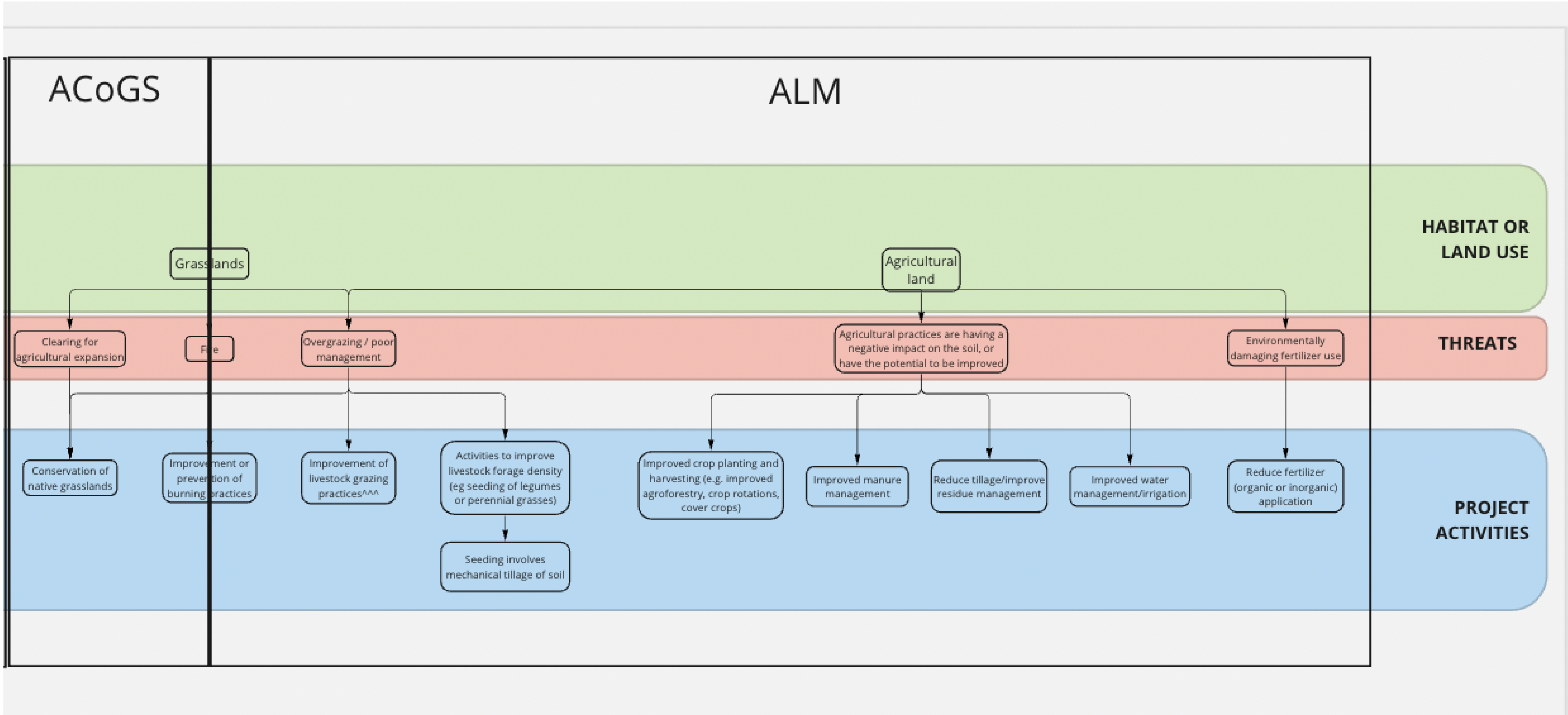
ACoGS
ALM
HABITAT OR LAND USE
THREATS
PROJECT ACTIVITIES
Grasslands
Agricultural land
Clearing for agricultural expansion
Fire
Overgrazing / poor management
Agricultural practices are having a negative impact on the soil, or have the potential to be improved
Environmentally damaging fertilizer use
Conservation of native grasslands
Improvement or prevention of burning practices
Improvement of livestock grazing practices^^^
Activities to improve livestock forage density (eg seeding of legumes or perennial grasses)
Seeding involves mechanical tillage of soil
Improved crop planting and harvesting (e.g. improved agroforestry, crop rotations, cover crops)
Improved manure management
Reduce tillage/improve residue management
Improved water management/irrigation
Reduce fertilizer (organic or inorganic) application

Annex Three – Versions of VCS documents used

VCS Program Guide v4.4 (updated 29th August 2023)

VCS Standard v4.5 (updated 11th December 2023)

VCS Methodology requirements v4.4 (updated 11th December 2023)

Program Definitions v4.4 (updated 29th August 2022)

Registration and Issuance Process v4.4 (updated 4th October 2023)

Mangrove forest and coral reefs in split shot,
Gam Island,Indnonesia
Phootgraph by Anemone Adobe Stock

wetlands.org

Our vision is a world where wetlands are treasured and nurtured for their beauty, the life they support and the resources they provide. Our mission is to inspire and mobilise society to safeguard and restore wetlands for people and nature.

Commissioned this report to Silvestrum Climate Associates

In close collaboration with Commonland and Landscape Finance Lab

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