Discussion paper: A condition-based framework for the IFLM method

Summary:

An important requirement for a high integrity Integrated Farm and Land Management (IFLM) method is to ensure additionality: that is ensuring the method only credits carbon stock increases that are caused by project activity changes that demonstrably would not have occurred in the absence of the carbon project. For woody biomass regeneration activities, this requires establishing a clear causal relationship between the drivers of that caused declines in carbon stocks and ecosystem condition and the active project land management interventions that unlock verifiable improvements in condition and carbon storage, while ruling out other potential causes as the primary driver of degradation or recovery.

A recent update by DCCEEW proposed addressing additionality and eligibility by dividing land into broad 'cleared' and 'uncleared' categories based on recent clearing history. However, this discussion paper outlines why such a binary distinction is not appropriate to diagnose the core drivers of ecosystem state change across Australia. In other words, it does not address the issues of additionality, eligibility and causality across diverse Australian landscapes.

Whilst clearing history can be an important determinant of ecosystem state, in some instances, there are a broad range of other factors including fire, grazing, soil disturbance, feral animals, and climatic events. To account for the full breadth of factors affecting ecosystem condition, we propose that a condition-based framework, based on the Vegetation Assets States and Transitions (VAST) framework and widely-used State and Transition Models (STMs), provides a fit-for-purpose tool with strong scientific and ecological foundations to appropriately assess baseline condition, link project management changes to anthropogenic drivers of carbon stock change, and ensure the integrity of credited abatement under the IFLM Method. VAST and STM frameworks should be applied in a way that is compatible with, and informed by, Indigenous Ecological Knowledge (IEK).

An alternative condition-based approach

The aim of a land-based carbon project is to shift the ecosystem from a low carbon state to a higher carbon state (or to prevent the ecosystem from shifting to a lower carbon state), by applying management changes specifically targeted at the drivers that have altered ecosystem condition and caused a loss of carbon stocks. To ensure the additionality of an IFLM project, this requires a response to two key questions:

1. Does the ecosystem have carbon sequestration potential? If yes, then:
2. Is this potential unlocked by anthropogenic management changes?

As described below, the VAST framework is well-suited to answer the first question, while the STM frameworks can answer the second. Both frameworks should be applied in a way that gives appropriate recognition to IEK.

Using the VAST framework to determine sequestration potential

VAST was developed in Australia to classify native vegetation based on its degree of modification by human activities (anthropogenic modification) compared to a reference state (i.e. natural or 'benchmark'). VAST can be used at the outset of an IFLM project to assess whether an ecosystem is likely to be in a low or high carbon state. Based on its VAST classification, ecosystems that are already in a high carbon state, with little or no risk of carbon loss, would be ruled out as unsuitable for an IFLM project. Ecosystems that are in a low carbon state might be suitable for an IFLM project and would be subject to further eligibility checks including using STMs to determine if human intervention is required for sequestration, as described below.

VAST describes seven different classes of vegetation along a continuum of anthropogenic impact, from 'residual' (least modified state of condition, but not necessarily intact) through to removed/replaced (ecosystems that have been heavily changed since settlement and are dominated by non-native species, e.g., pasture, crops or non-vegetated). The VAST classification assesses the degree of modification or transformation with reference to changes in structure, composition, and whether the ecosystem is dominated by native species, or has been replaced with introduced species. The VAST classification has been used to assess the degree of vegetation modification in Australia's State of the Environment reporting since 2011.

Using STMs to diagnose appropriate management interventions

STMs are conceptual models that represent dynamic ecosystems. STMs can be used to diagnose the drivers causing ecosystems condition to persist in a low carbon state (as determined using VAST). When triangulated with management evidence, the STM will help inform whether anthropogenic land management interventions are required to increase (or avoid decrease) in carbon stock. Based on the STM, ecosystems that appear to have no or few barriers to passive recovery, would be ruled out as unsuitable for an IFLM project. Conversely, ecosystems where barriers to passive recovery exist, and the ecosystem condition is 'stuck' in a low carbon state, might be suitable for an IFLM project.

STMs are suitable to diagnose IFLM project interventions because they recognise that ecosystems can exist in multiple, alternative conditions or 'states' (like those described in the VAST framework) and distinguish between stable and transient states. STMs explicitly articulate the drivers that cause (or limit) transitions between high and low carbon states.

Box 1: Drivers causing degradation or stability in a lower condition state

Establishing the baseline condition for an IFLM project involves identifying how interactions between natural disturbances and ongoing land management (drivers) have led to the current degraded state. These interactions can create ecological conditions (e.g., severe soil degradation, loss of native seed bank, dominance of competitive weeds) that lock ecosystems into degraded states, preventing passive recovery even if climate conditions are favourable for recovery.

Identifying specific human-influenced drivers that actively maintain lower condition states that prevent natural recovery is necessary to define eligible project areas and target activities to stimulate ecosystem recovery. For example:

- Intensive land uses such as agriculture, infrastructure or forestry can alter structure and composition (e.g., 'modified', 'transformed' or 'replaced').
- Sustained high grazing pressure (by livestock and/or feral herbivores) can simplify vegetation structure, alter species composition, compact soil and maintain the ecosystem in a lower condition state (e.g. 'modified' or 'transformed').
- Altered or extreme fire regimes can prevent maturation and eliminate fire-sensitive species, potentially locking the system into changed structure and composition (e.g. 'modified', 'transformed' or 'replaced').

Levers supporting recovery or transition to an improved condition or state

In cases where the STM reveals that an anthropogenic management intervention is necessary to transition the ecosystem to a higher carbon state (or prevent its transition from a higher carbon state), the IFLM project's Land Management Strategy (LMS) must detail the specific package of planned interventions designed to counteract the identified barriers that maintain the degraded baseline state, and activities necessary to facilitate transition towards a desired higher-condition VAST state. That is, there must be a causal relationship between the drivers that caused a loss of carbon stocks and the mechanisms by which project activities will address these drivers[1]. The desired higher state does not have to be a reference condition state, as in some instances the land management goal may be to improve the carbon storage and ecosystem condition, but to a state that is balanced and fully compatible with other agricultural production goals. Developing an

[1] Recommendation 8.1 from the Independent ACCU Review (2024) was that methods should be interpreted as requiring:

1. evidence of a causal relationship between the nominated eligible [project] activity or activities and the dominant suppression mechanism(s) that occurred through the entirety of the baseline period;
2. demonstration that these suppressors are directly addressed by the [project] activity or activities throughout the life of the project; and
3. demonstration that the application of [carbon stock estimation] is consistent with the guidelines.

effective LMS often requires expert ecological input to tailor actions appropriately to the specific ecosystem and its condition.

Key components of such land management strategies can include:

- Implementing strategic grazing management (e.g., reducing stocking rates, rotational grazing, exclusion fencing), targeted weed control, and pest animal control to alleviate pressures that suppress or displace regenerating native vegetation.
- Restoring ecological process such as ecological thinning (where necessary) to restore natural system structure and function.
- Actively re-establishing native woody species through seeding or planting, where natural regeneration is unlikely due to past impacts (e.g., loss of seed bank) or where the desired transition involves establishing woody cover in a 'replaced' state.

Tying it together: a nationally consistent scientific framework for land eligibility

IFLM project eligibility would require data to demonstrate that areas exist within a degraded (i.e. low carbon) VAST state due to human-induced drivers (or has the potential to transition to a low carbon state, in the case of an avoided clearing project). Specifically, project land must be within the modified, transformed, removed or replaced VAST categories representing a structural or compositional change associated with a loss of carbon stocks. This evidence-based approach would enable clear differentiation from transient natural variability and ecosystems already on recovery trajectories that do not require additional interventions.

Further, a project’s LMS would outline the target higher state the land manager is seeking to achieve and associated project activities needed to directly address the drivers identified as causing (or maintaining) the degraded state and that enable transition to a higher condition state. The strategy will rely on a STM framework to establish a clear causal pathway showing how project activities facilitate recovery towards a higher ecosystem condition (VAST) category with increased carbon stocks.

Additionality is established using a weight-of-evidence approach informed by the STM, that demonstrates that without specific project interventions, the ecosystem would likely either continue to degrade or remain ‘trapped’ in its current, lower condition VAST state. The condition assessment framework must integrate indicators of woody carbon (e.g. tree and shrub structure, biomass, and cover) to show that the VAST states correspond with depleted carbon stores.

Alignment of VAST and STM approach with Offsets Integrity Standards

<u>Additionality</u>: The condition-based approach strengthens additionality by moving beyond simple baselines. It categorically shows that land has been modified by human interventions since settlement, and that without specific targeted interventions it will stay locked in a degraded condition.

Eligibility: The condition-based approach provides clear, ecologically meaningful eligibility criteria that is compatible with and informed by IEK and based on demonstrable degradation levels (VAST states) and identified barriers to recovery (STMs), offering a more targeted and defensible approach than binary classifications like clearing history. It also provides greater potential to integrate with Nature Repair methods that can readily utilise the same nationally applicable frameworks.

Evidence-based: This approach grounds project assessment in ecological science (VAST states, STMs), and requires the synthesis of best-available knowledge including IEK, (where appropriate), field data, remote sensing, models, expert opinion. Together, these frameworks provide a transparent, verifiable logic for how interventions lead to abatement, aligned with the causality recommendations in the Independent ACCU Review.

Measurement: By linking abatement to measurable progress toward defined ecological condition states, this approach provides a verifiable basis for quantifying changes in relevant carbon pools (woody biomass) in an ecologically meaningful way.

Conservative: The condition-based approach is an upfront test to ensure potential for carbon storage improvements, but ultimately projects only get credited for the actual changes that occur as verified by robust measurement and modelling approaches. As such, this framework helps to exclude land without potential for carbon increases due to land management practice changes, and conservativism is further dealt with in the abatement calculation rules.

Drawbacks of using ‘cleared/uncleared’ as a binary threshold

While recent clearing can sometimes be detected via satellite, in many cases the "uncleared" categorisation tells us almost nothing meaningful about the land's actual condition or its potential to store more carbon. This broad "uncleared" label lumps together everything from pristine, high-carbon forests to woodlands and shrublands severely degraded after decades of grazing, rendering the distinction ecologically blunt and unfit for the spectrum of land degradation that exists in different parts of Australia.

If eligibility was based solely on recent ‘comprehensive clearing’, carbon farming would be locked out of the single largest opportunity for landscape-scale carbon sequestration and ecological repair in Australia: restoring the vast tracts of existing, nominally "uncleared" woodlands and forests suffering from this legacy of historical over-grazing and related degradation. Moreover, there are differing jurisdictional-level definitions of ‘clearing’ and no single dataset that assesses comprehensive clearing of forest nationally.

In some cases, satellite-based detection of clearing may be an important line of evidence for determining the primary cause of ecosystem condition, however it is rarely the only driver of degradation. Providing confidence in the causal relationship between declines in carbon stocks (or risk of carbon stock losses) requires a comprehensive weight of evidence approach. For example, satellites cannot detect the widespread practice of clearing early regrowth (where trees are young or sparse), limiting their application only to recent deforestation events (i.e. management post 1988 when the first time series satellite data is available). Using this arbitrary historical snapshot ignores the vast ecological modification and carbon depletion caused by land management practices in the

~200 years since settlement. Many pastoral leases in Australia were granted on the condition they be heavily modified for agricultural practices, and much of this transformation occurred prior to 1988.

The narrow focus of a clearing based approach risks profound inequity, systematically excluding some States and Territories, and disadvantaging land managers, including Indigenous land managers who continue to manage large tracts of land that forms part of the ongoing Indigenous Estate. Further, the binary approach may not be compatible with IEK. This exclusion is largely due to different approaches to land modification (including through fire and grazing pressure), and different time horizons (i.e. pre 1988 vs ongoing recent clearing history). An approach based on VAST and STM frameworks, informed by IEK, has greater national applicability but also balances requirements to ensure additionality and a strong scientific evidence base.

Conclusion

Adopting a condition-based framework, grounded in established ecological science through tools like VAST and STMs, with appropriate inclusion of IEK, provides the necessary foundation to accurately assess baselines, establish clear causal links between management interventions and carbon outcomes, and ensure additionality. This approach aligns method design with ecological processes, supports the OIS, and unlocks the significant potential to incentivise the restoration and improved management of degraded ecosystems across Australia's diverse landscapes. Implementing a condition-based framework is essential for developing an IFLM method that is effective, credible, equitable, and capable of delivering substantial environmental benefits.

About the IFLM Taskforce

In 2021, the Carbon Market Institute (**CMI**) formed the Integrated Farm and Land Management method Taskforce (**IFLM Taskforce**). The IFLM Taskforce is made up of a broad cross-section of CMI members and stakeholders that are committed to a high-integrity, fit-for-purpose carbon market in Australia.

Since its creation, the IFLM Taskforce has sought to develop and provide technical advice to the Australian Government on the creation of an IFLM method for the Australian Carbon Credit Unit Scheme (**ACCU Scheme**), including as part of the initial method prioritisation process.

The IFLM Taskforce also wants to see widespread consultation and clear development timelines in a way that ensures adequate public consultation and expert input from a wide range of experts and stakeholders.

The views of the IFLM Taskforce do not necessarily represent the views of CMI, nor any individual CMI member.

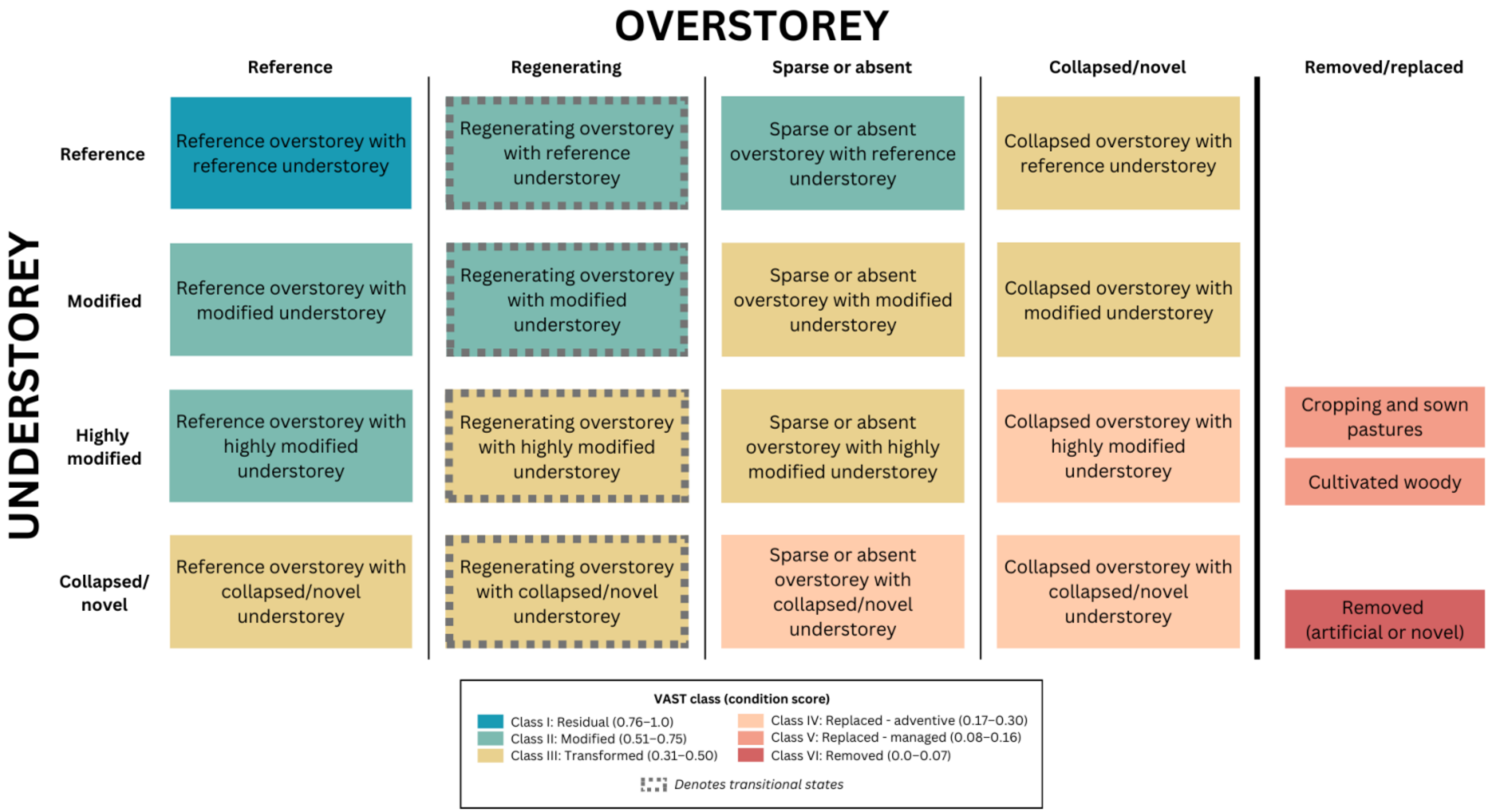

Figure 1. Example of VAST classifications applied to generalised states for ecosystems with overstorey and understorey components of ecosystems. Modified or transformed states with regenerating or sparse absent overstorey are likely to represent opportunities for eligible carbon abatement by implementing activities that facilitate regeneration of woody biomass. States where the overstory has been replaced or removed may require more intensive restoration activities (e.g. planting, seeding).

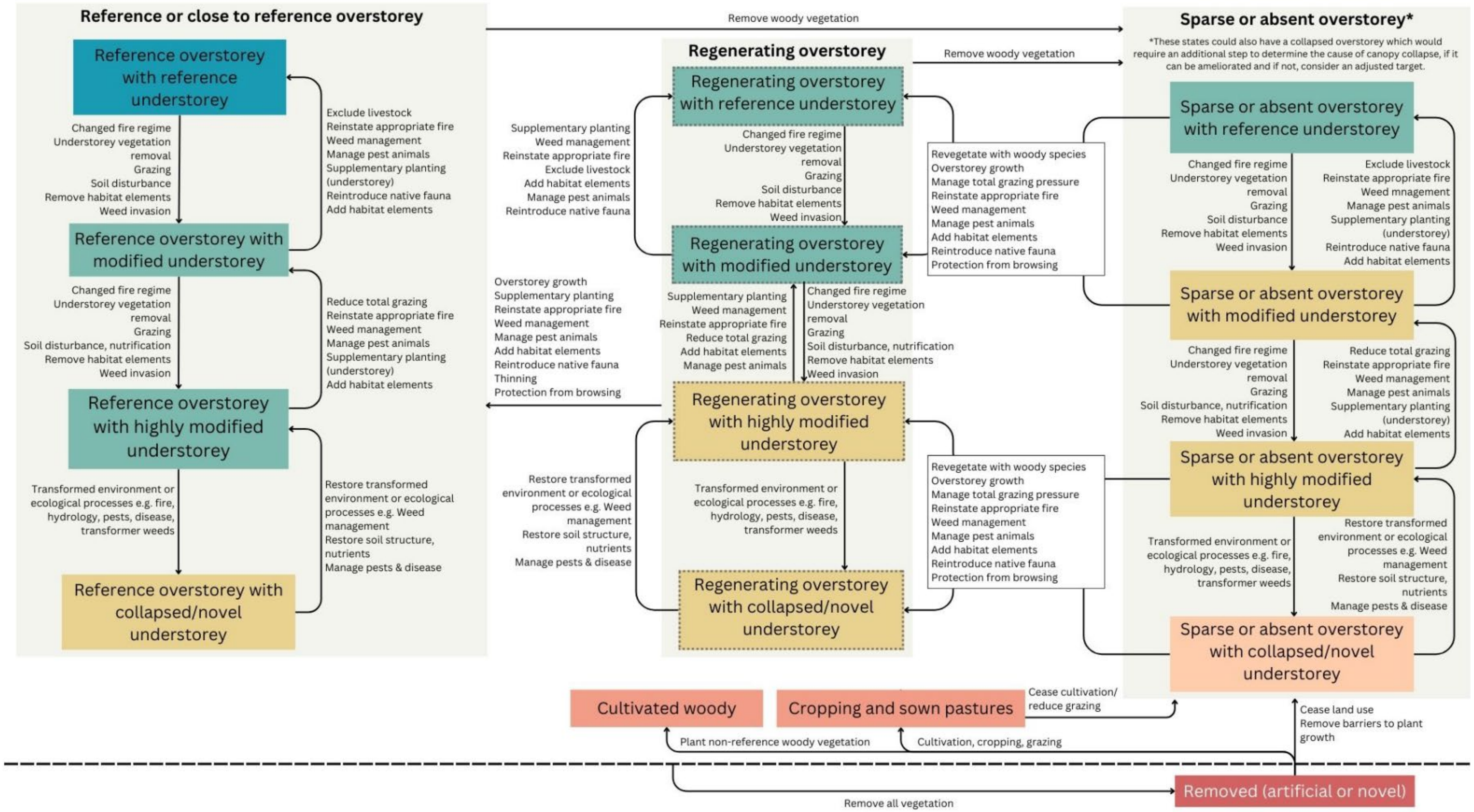

Figure 2. Example of an STM with arrows describing the drivers that transitions ecosystems between degraded and recovering states