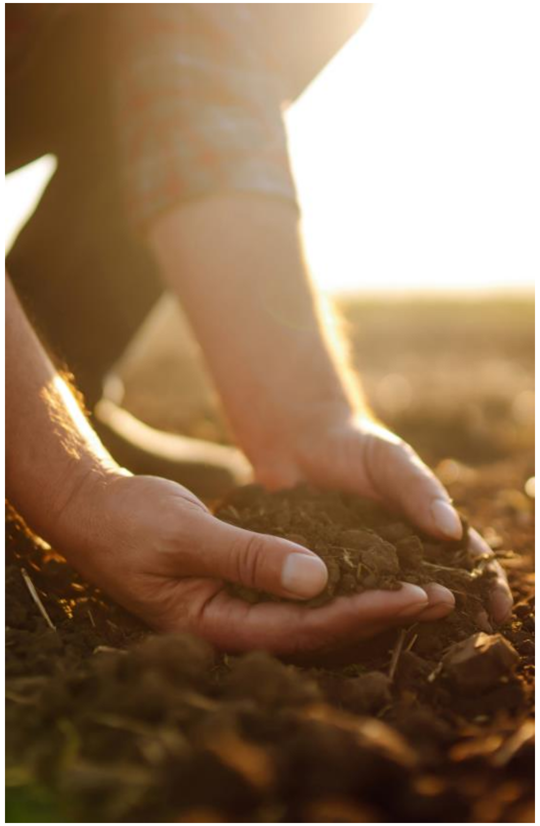
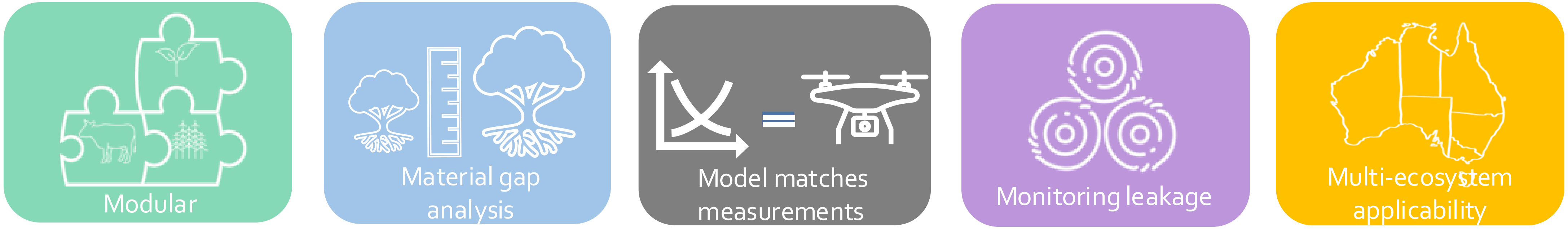
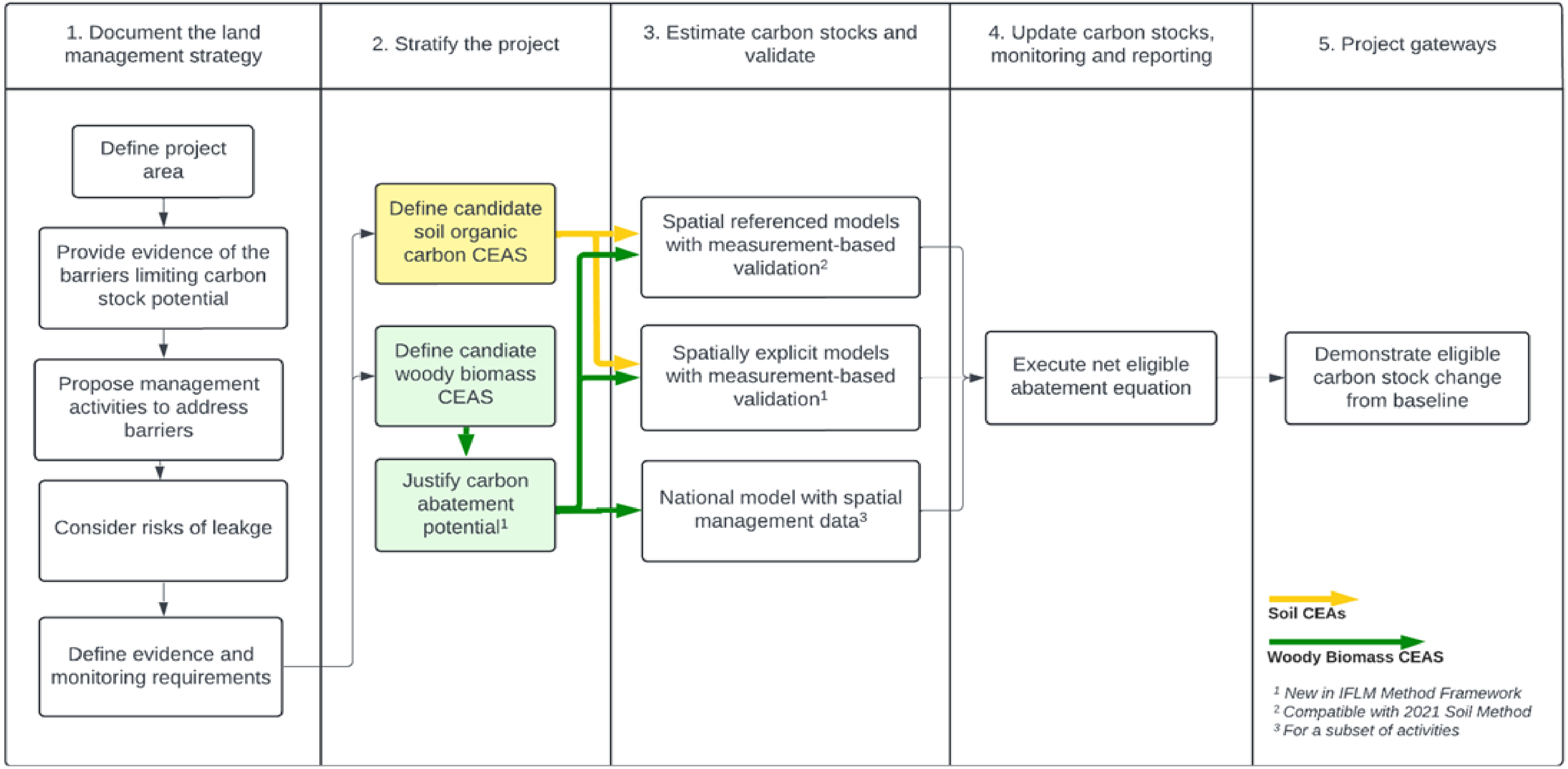
Session 1: Overview of five-step project cycle & application in diverse ecosystems around Australia



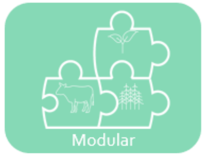
Five major innovations of IFLM

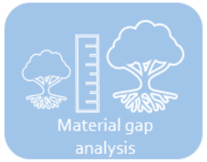


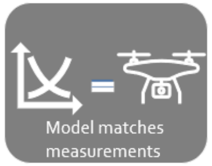
Session 1: Overview five-step IFLM project cycle

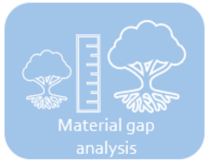


Multi-ecosystem applicability









Session 1: Case Studies

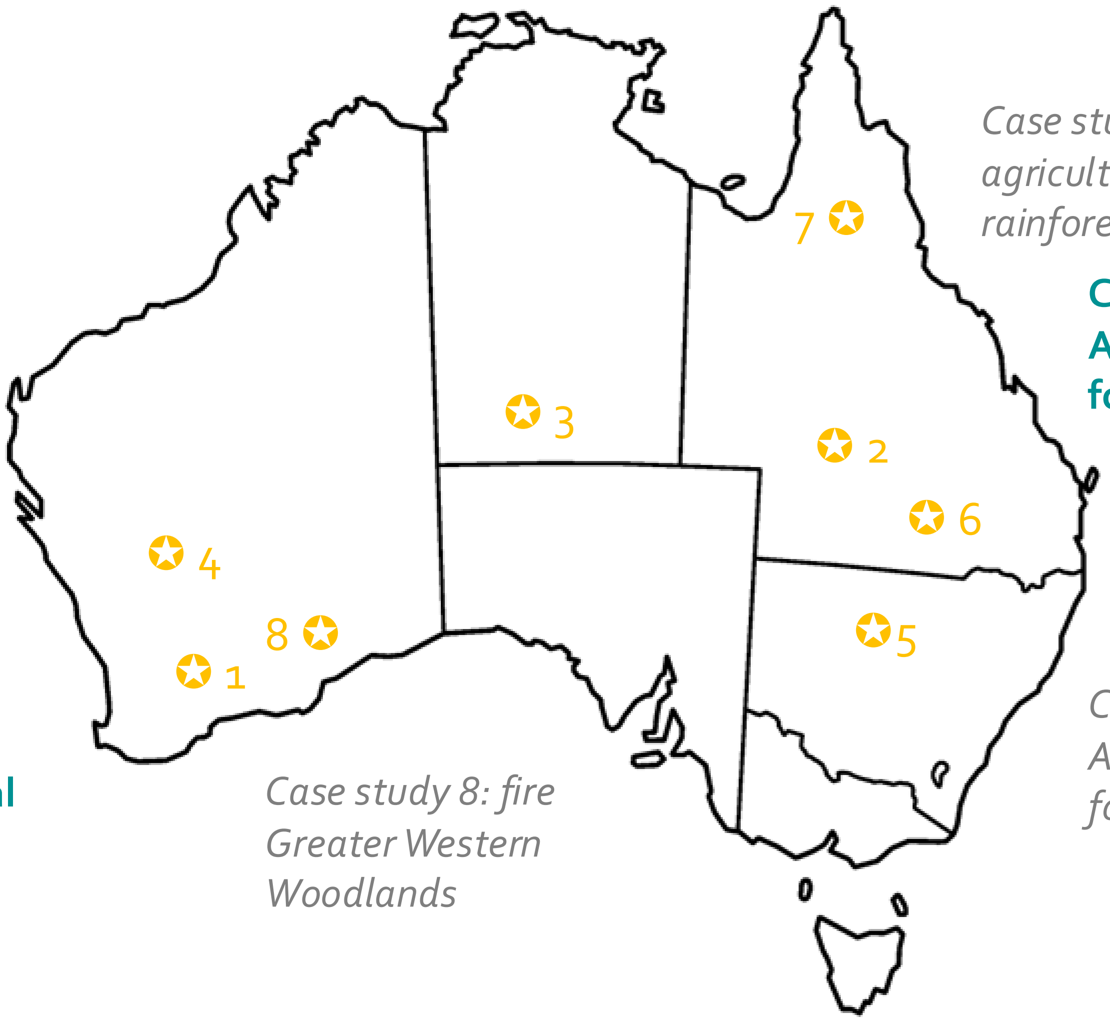
Case study 3 (NT): Acacia woodland, open shrublands

Case study 7 (QLD): Cleared agricultural land → Wet highland rainforest

Case study 6 (QLD): Acacia woodlands & forests (Brigalow Belt)

Case study 2 (QLD): Acacia woodlands & forests (Mulgalands)

Case study 4 (WA): Acacia woodlands, open shrublands

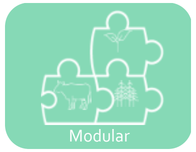


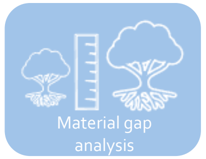
Case study 5 (NSW): Acacia woodland & forests (Mulgalands)

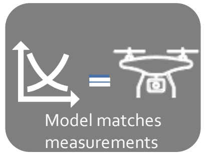
Case study 1 (WA): Cleared agricultural land → Eucalypt woodlands

Case study 8: fire Greater Western Woodlands

Case study 1 (WA): Cleared agricultural land → Eucalypt woodlands

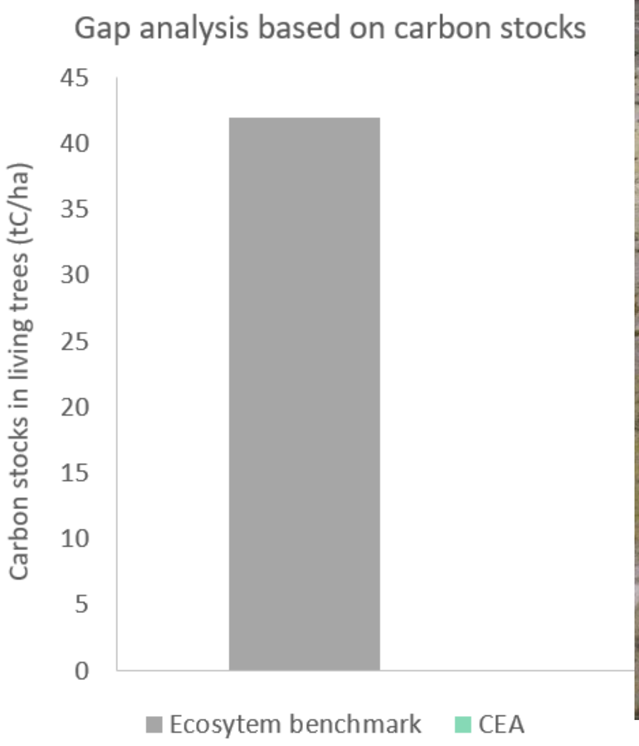




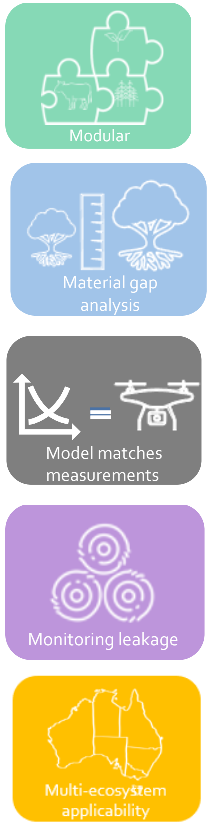


IFLM Step	Property type & size	Mixed farming enterprise, 4,600 ha
1a	Location	Katanning, WA – 478 mm annual rainfall
	Traditional Owners	Goreng People
	Currently registered under ACCU scheme?	Woody biomass: Yes, under the environmental plantings method Soil: Yes
1b	Barriers limiting carbon sequestration potential	**Ecological:** Tree recruitment requires good rainfall for spontaneous germination, followed by low or no grazing pressure **Biological**: Competition from introduced grass species and a lack of native seed source or propagules **Physical/chemical:** Over-grazing and soil cultivation has led to a lack of year round ground cover, leading to poor rainfall infiltration
1c	Management activities to address barriers	**Ecological:** Temporarily removed grazing pressure **Biological:** Introduced native tubestock i.e. facilitated regeneration **Physical/chemical:** Deep ripped to ensure favourable seed bed
1d	Risk based leakage assessment	Leakage risk is low-moderate. Grazing temporarily displaced until trees are above grazing height. Leakage mitigation strategy involved planting in strips to facilitate an optimal tree/pasture balance, livestock will be re-introduced once trees exceed grazing height.
1e	Evidence & monitoring examples	Receipts for planting contractors and purchase of seedlings Satellite based monitoring of survival and transition to forest cover
2a	Stratify the project	Soil & planting CEAs (350ha) would fully overlap under IFLM
2b	Material gap analysis	Based on aboveground woody carbon stock CEA: 0 t C ha^{-1} Ecosystem benchmark: 42 t C ha^{-1} (conceptual model)

Case study 1 (WA): Cleared agricultural land → Eucalypt woodlands

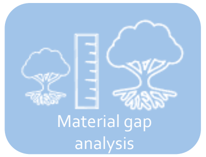


Case study 2 (QLD): Acacia woodlands and forests; Mulgalands



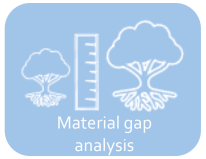
IFLM Step	Property type & size	Rangelands pastoral enterprise; ~60,000 ha
1a	Location	Cheepie, QLD – 348 mm annual rainfall
	Traditional Owners	Bidjara and Mardigan Peoples
	Currently registered under ACCU scheme?	Woody biomass: Yes, under the under the human induced regeneration method
1b	Barriers limiting carbon sequestration potential	**Ecological**: Tree recruitment typically requires above-average summer rainfall **Biological**: Overstocking of domestic livestock leads to use of trees as fodder, especially damaging for young seedlings **Physical/chemical:** Heavy grazing removes ground cover during dry periods, leading to poor infiltration capacity and reduced productivity when water returns, exacerbating reliance on trees for fodder
1c	Management activities to address barriers	**Biological**: Reduce/modify stocking rate to reduce livestock consumption of tree fodder **Physical/chemical**: Increase pasture rest to improve ground cover, increase rainfall infiltration
1d	Risk based leakage assessment	Fodder harvesting – Leakage risk is moderate-high. Project area contains a large non-implementation area under operational control of the proponent, where fodder harvesting could be displaced to. Leakage monitoring is required. Grazing – Moderate. Project could trigger displacement of fodder harvesting activity to provide feed for displaced livestock. Outline leakage prevention strategy in the LMS.
1e	Evidence & monitoring examples	Third-party evidence of livestock numbers over baseline and project period Assessment of actual vs 'safe' grazing pressure
2a	Stratify the project	Woody biomass: spontaneous regeneration new cohort 28,0000 ha spontaneous regeneration understorey 12,800 ha
2b	Material gap analysis (Justification of abatement potential)	CEA: 4 t C ha-1 Ecosystem benchmark: Option 1: Conceptual model: 18 t C ha^{-1} Option 2: reference ecosystem: 58 t C ha^{-1}

Case study 2 (QLD): Acacia woodlands and forests; Mulgalands



Step 2b: Material gap analysis

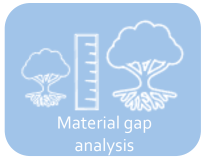
Case study 2 (QLD): Acacia woodlands and forests; Mulgalands



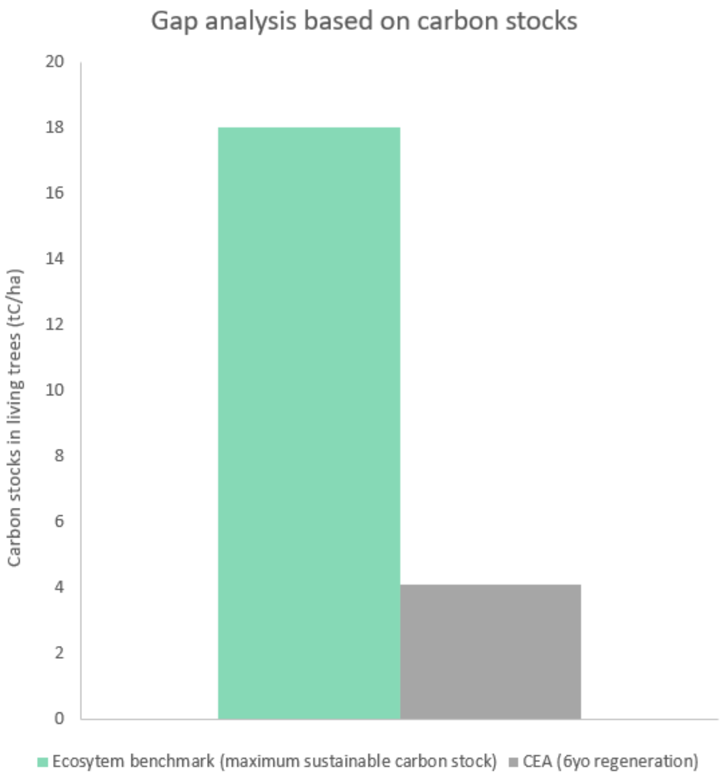
Step 2a: Stratification

Case study 2 (QLD): Acacia woodlands and forests; Mulgalands

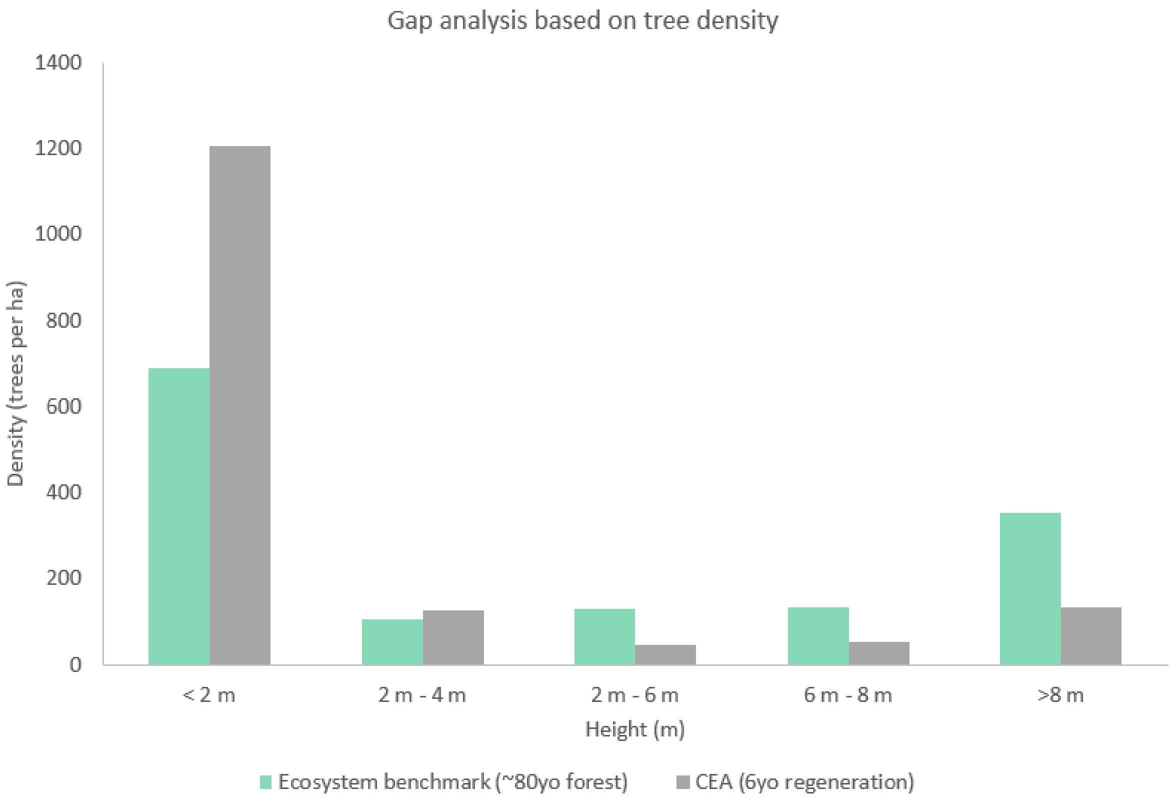
Step 2b: Material gap analysis



Option 1:

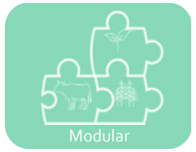


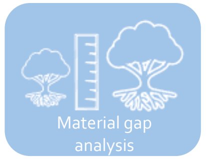
Option 2:

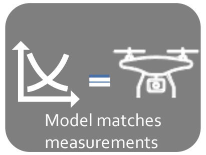


Case study 3: Northern Territory

Acacia woodland, open shrubland



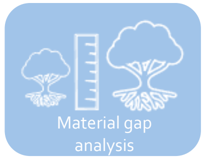




IFLM Step	Property type & size	Extensive grazing , circa 600k ha
1a	Location	South of Alice Springs
	Ecosystem	Acacia woodland/ open shrubland
	Traditional Owners	Central Land Council - Anangu
	Currently registered under ACCU scheme?	Woody biomass: Yes, under the human induced regeneration method (registered 2022)
1b	Barriers limiting carbon sequestration potential	Ecological: Dysfunctional hydrological processes Biological: Very high grazing pressure, feral grazing pressure
1c	Management activities to address barriers	Ecological: slow rates of water flow Biological: Manage total stock, rest based grazing, reduce distance to water, reduce stock/water, feral control, increase groundcover/slow flow and increase infiltration
1d	Risk based leakage assessment	Leakage risk is low, as the carbon project investments will enable more strategic grazing management, meaning stock numbers are matched to safe grazing limits and developed sustainably
1e	Evidence & monitoring examples	Stock numbers and distribution, feral control, water point development costs,
2a	Stratify the project	Aboveground CEA
2b	Material gap analysis (Justification of abatement potential)	Field survey (species ID and stem counts), fixed wing and plot-based LiDAR for height classes Reference condition

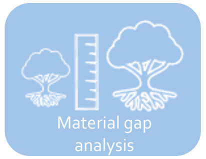
Case study 4: Northern Territory

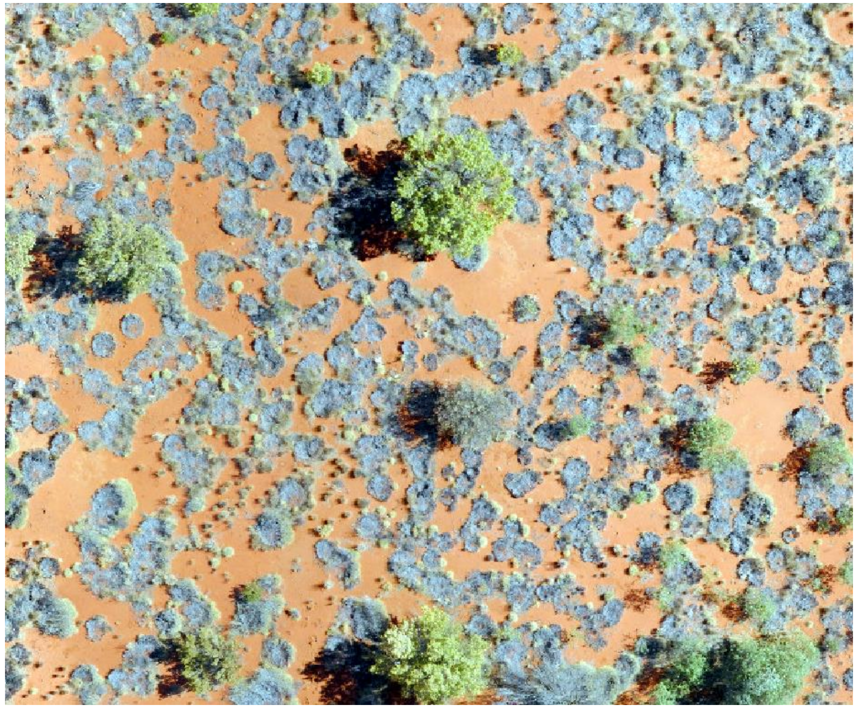
Acacia woodland, open shrubland



Case study 4: Northern Territory

Acacia woodland, open shrubland

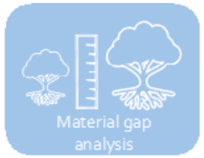


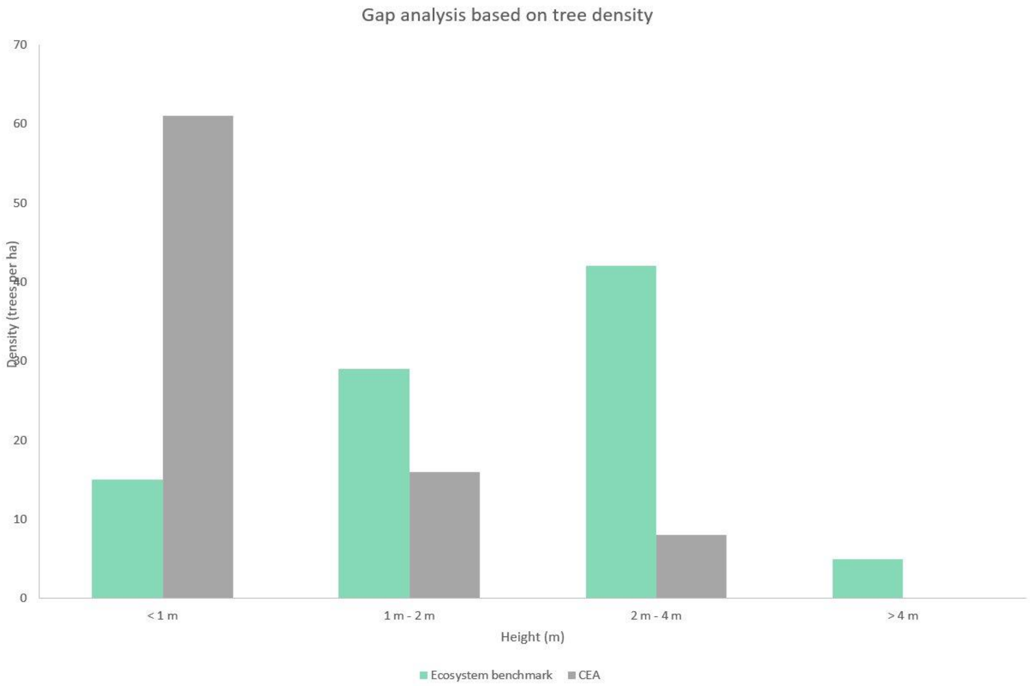


CEA

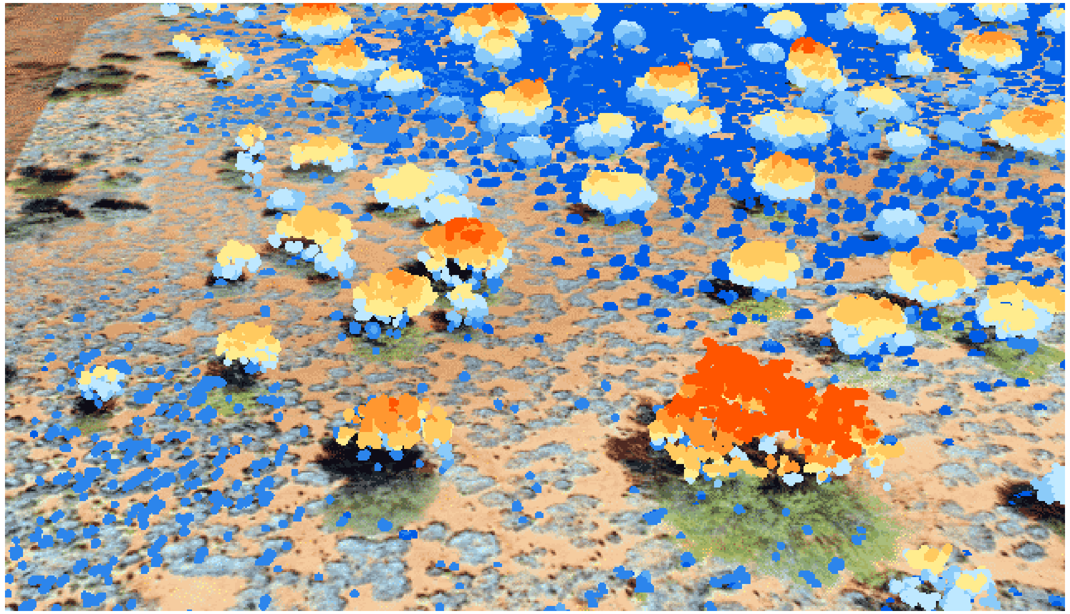
Forest

Case study 4: Northern Territory
Acacia woodland, open shrubland

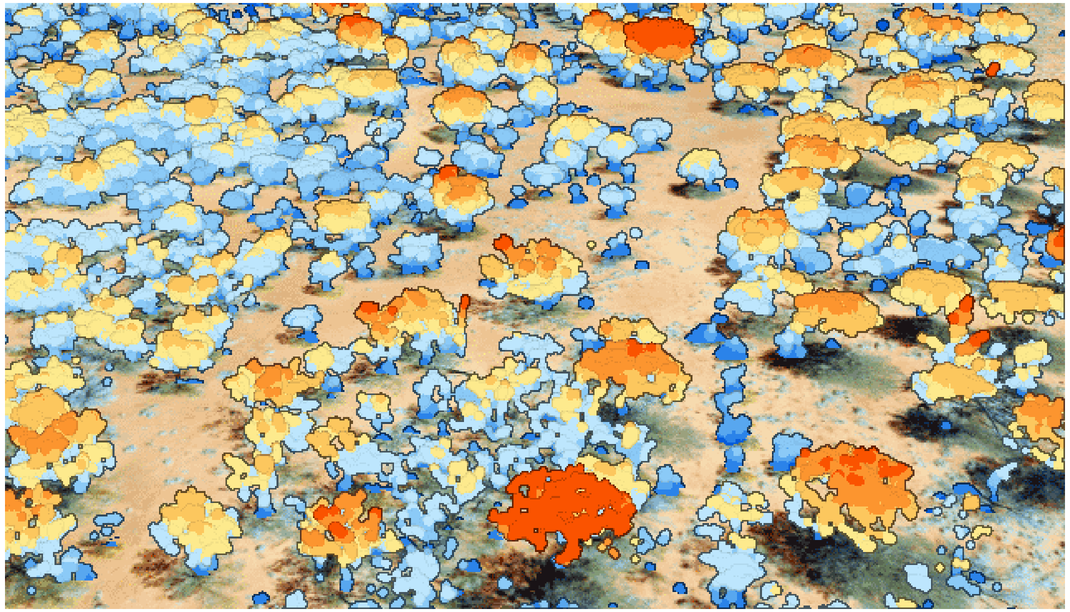




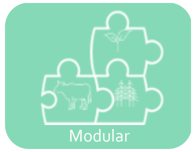
CEA

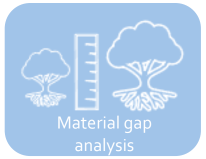


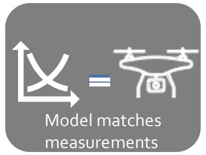
Forest



Case study : 4 Western Australia Acacia woodland and Open Shrubland







IFLM Step	Property type & size	Pastoral grazing (100,000 ha)
1a	Location	Murchison Shire, WA
	Ecosystem	Acacia woodlands and Open Shrublands
	Traditional Owners	Wajarri Yamaji Aboriginal Corporation RNTBC
	Currently registered under ACCU scheme?	Woody biomass: Yes, under the under the human induced regeneration method (registered 2023)
1b	Barriers limiting carbon sequestration potential	**Ecological**: Tree recruitment typically requires above-average summer rainfall **Biological**: Overstocking of domestic livestock (exacerbated by drought) leads to use of tree sand tall shrubs as fodder, especially damaging for young seedlings **Physical/chemical:** Heavy grazing removes ground cover, leading to poor infiltration capacity and reduced productivity when water returns, exacerbating reliance on trees and shrubs as forage
1c	Management activities to address barriers	**Biological**: Changing the timing and extent of grazing
1d	Risk based leakage assessment	Low
1e	Evidence & monitoring requirements	Stock records, on-ground monitoring of recruitment and recovery
2a	Stratify the project	Stratification based on geophysical, vegetation and management data sets coupled with field-based sampling and remote sensing
2b	Material gap analysis (Justification of abatement potential)	Used stem density measures comparing CEA and forest areas demonstrates potential

Case study 4: Western Australia (Acacia Woodlands and Open Shrublands)

Step 1e: Evidence & Monitoring Examples

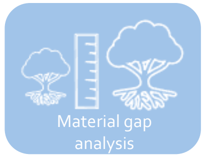

Loss of vegetation cover due to heavy grazing around waterpoint


Grazing damage to Slender mulga

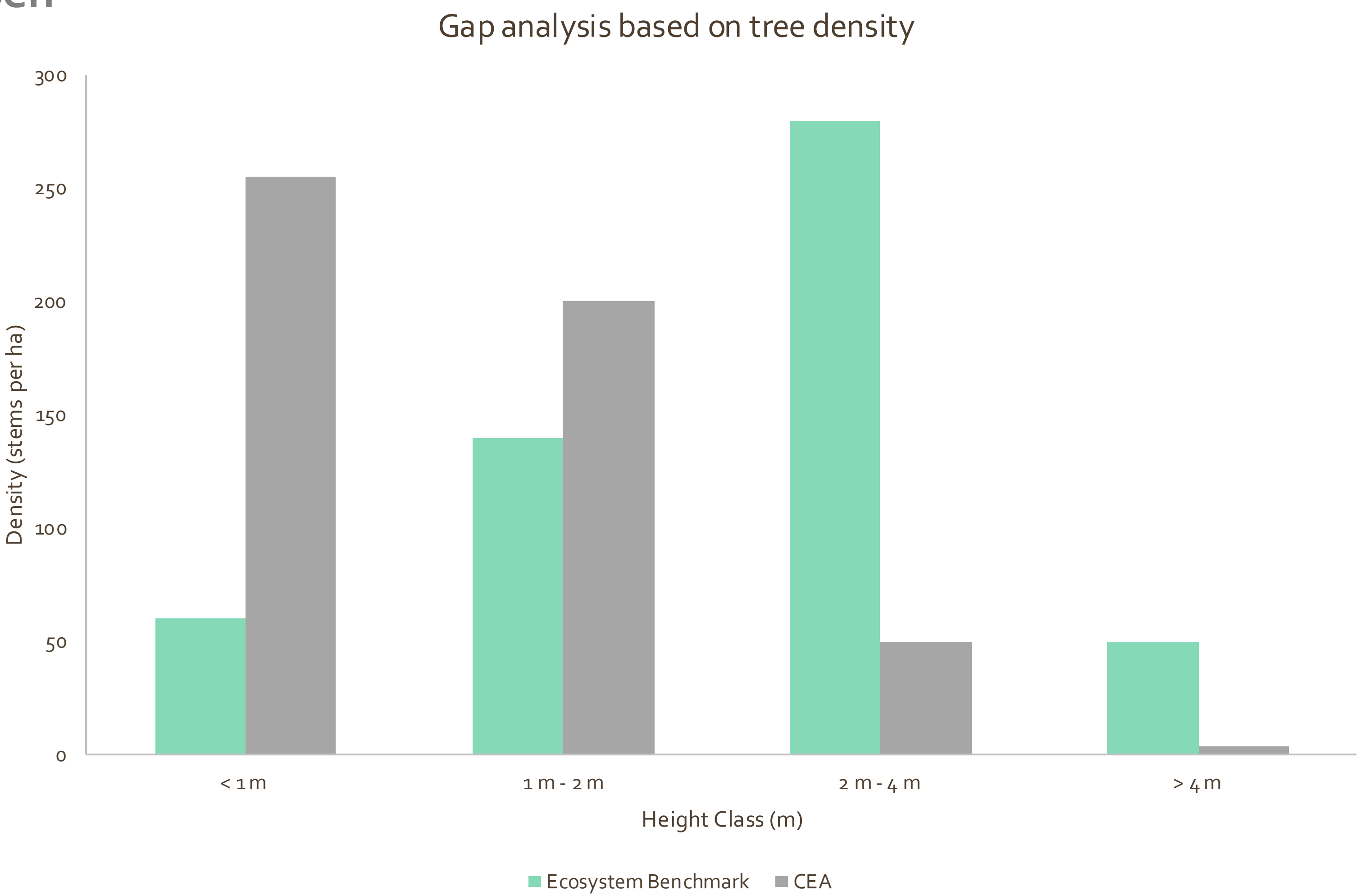

Slender mulga recruitment

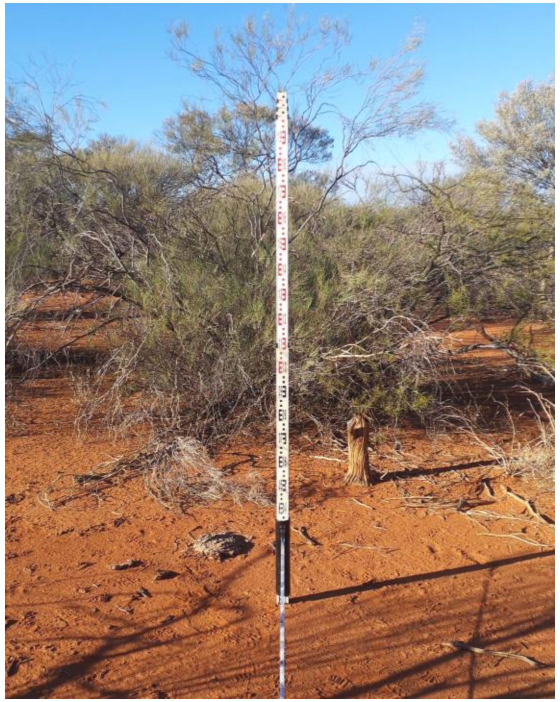

Loss of vegetation cover due to grazing

Case study 4: Western Australia (Acacia woodlands, open shrublands)



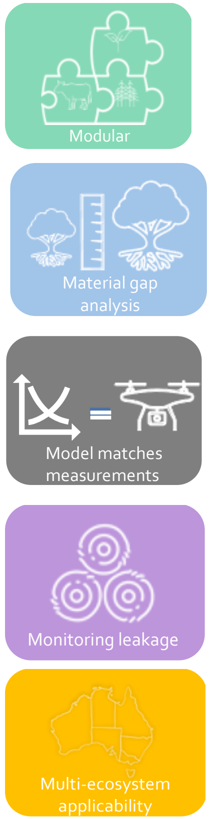
Step 2b: Material gap analysis





Example Acacia woodland ecosystem benchmark

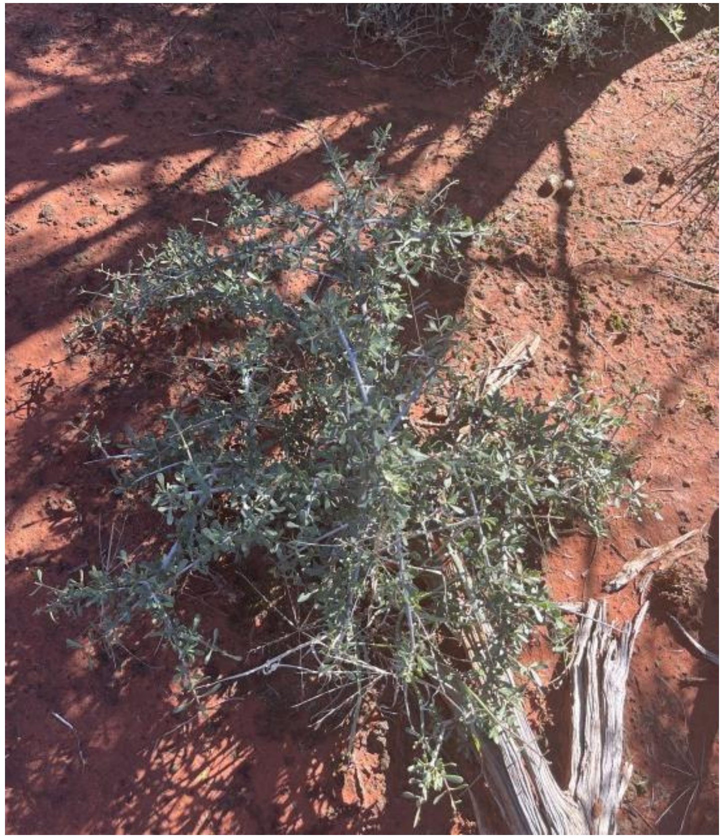
Case study 5 (NSW): Acacia woodland & forests (Mulgalands)



IFLM Step	Property type & size	Pastoral grazing (9,000 ha)
1a	Location	Bourke, NSW. 300 mm annual rainfall
	Ecosystem	Acacia woodlands and forests
	Traditional Owners	Ngemba/Ngiyaampa Peoples
	Currently registered under ACCU scheme?	Yes, under the human induced regeneration method
1b	Barriers limiting carbon sequestration potential	**Ecological**: Tree recruitment typically requires above-average summer rainfall **Biological**: Overstocking of domestic livestock & feral animals (exacerbated by drought) leads to use of trees and tall shrubs as fodder, especially damaging for young seedlings **Physical/chemical:** Heavy grazing removes ground cover, leading to poor infiltration capacity and reduced productivity when water returns, exacerbating reliance on trees and shrubs as forage
1c	Management activities to address barriers	**Biological:** Remove livestock (goats) and manage feral goat incursion
1d	Risk based leakage assessment	Low
1e	Evidence & monitoring requirements	Stock records, on-ground monitoring of recruitment and recovery
2a	Stratify the project	Stratification based on geophysical, vegetation and management data sets coupled with field-based sampling and remote sensing
2b	Material gap analysis (Justification of abatement potential)	Stem density measurements show statistically significant gap for all height classes above 2m

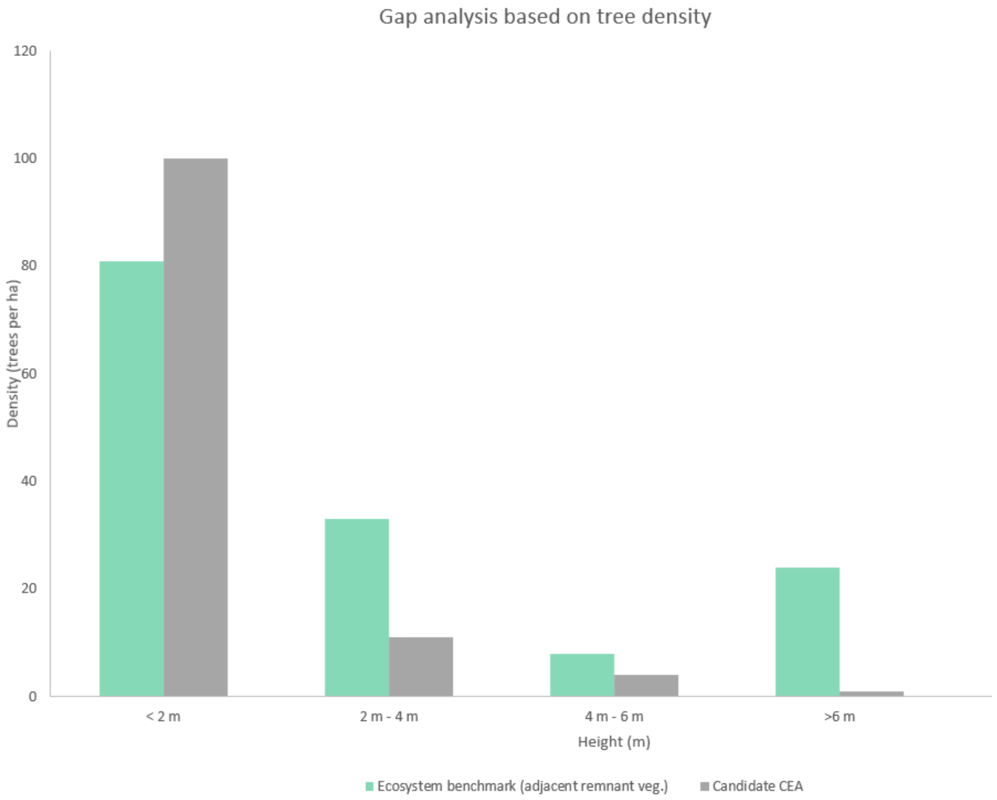
Case study 5: Acacia woodland and forests; NSW

Material gap analysis

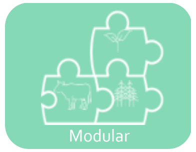


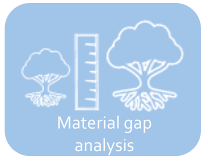
Heavily suppressed Leopardwood (has thorns at a young age which gives it ability to survive heavy grazing pressure)

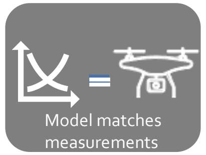
Mature Leopardwood at same site, showing carbon sequestration possible if young Leopardwood cohort is allowed to progress past grazing height.



Case study 6 (QLD): Acacia woodlands & forests (Brigalow Belt)

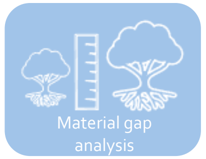


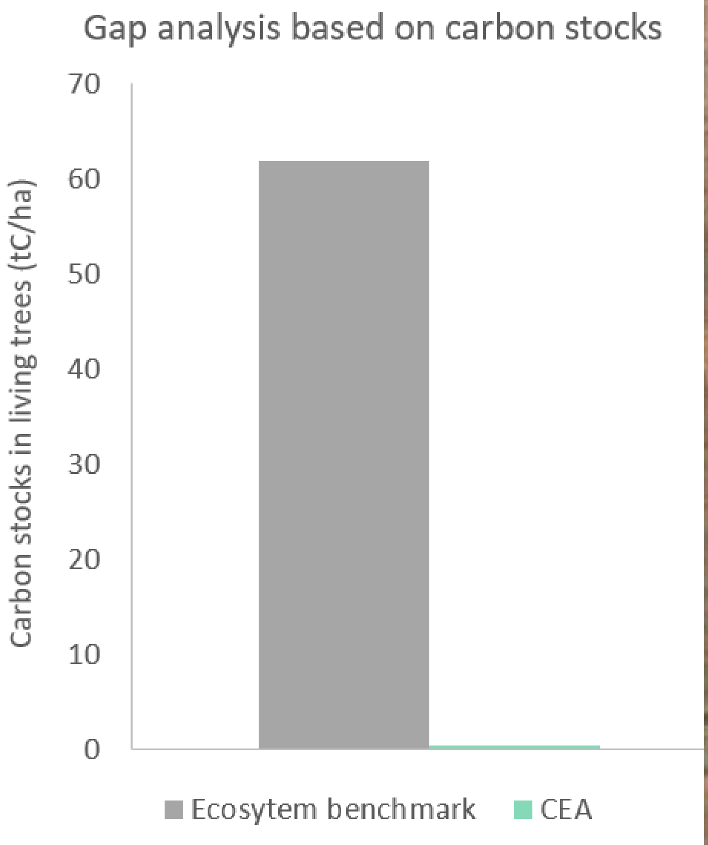


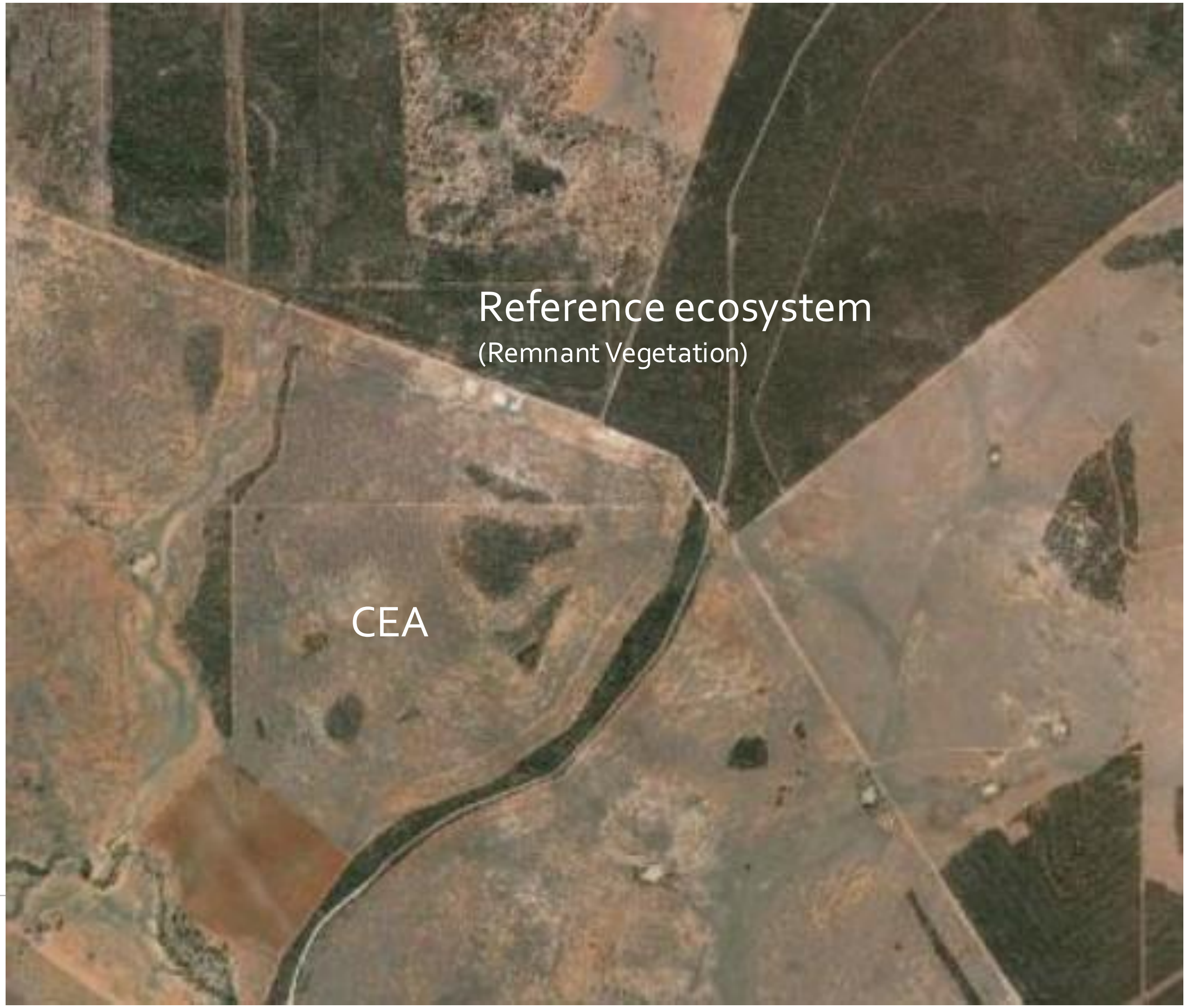


IFLM Step	Property type	Rangelands pastoral enterprise; 24,600 ha
1a	Location	Surat, QLD; 500mm annual rainfall
	Traditional Owners	Gunggarri People
	Currently registered under ACCU scheme?	No
1b	Barriers limiting carbon sequestration potential	**Ecological**: Competition from introduced grass species **Biological**: Overstocking of domestic livestock animals leads to high mortality of young seedlings, exacerbated by drought **Physical/chemical**: Mechanical suppression of woody biomass
1c	Management activities to address barriers	**Biological:** Reduced stocking rate, increased paddock rest **Physical/chemical**: Cessation of clearing
1d	Risk based leakage assessment	• Mechanical suppression – Leakage risk is moderate-high. Proponent has other properties under its operational control, clearing could be displaced to. Leakage monitoring is required. • Grazing – Moderate. Project could trigger displacement of clearing activity to provide feed for displaced livestock. Outline leakage prevention strategy in the LMS.
1e	Evidence & monitoring requirements	Confirmation of Category X classification land (i.e. permission to clear), clearing history (SLATS), fuel receipts from previous clearing activity, livestock numbers
2a	Stratify the project	Woody biomass – spontaneous regeneration CEA 6,000 ha
2b	Material gap analysis (Justification of abatement potential)	Option 1: Based on average aboveground carbon stock • CEA: 0.5 tC / ha • Ecosystem benchmark: 65 tC/ha (Reference ecosystem – adjacent paddock, remnant under QLD Vegetation Framework, with TERN biomass data collected in 2009)

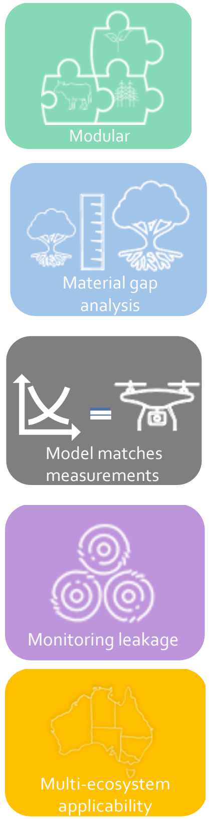
Case study 6 (QLD): Acacia woodlands & forests (Brigalow Belt)





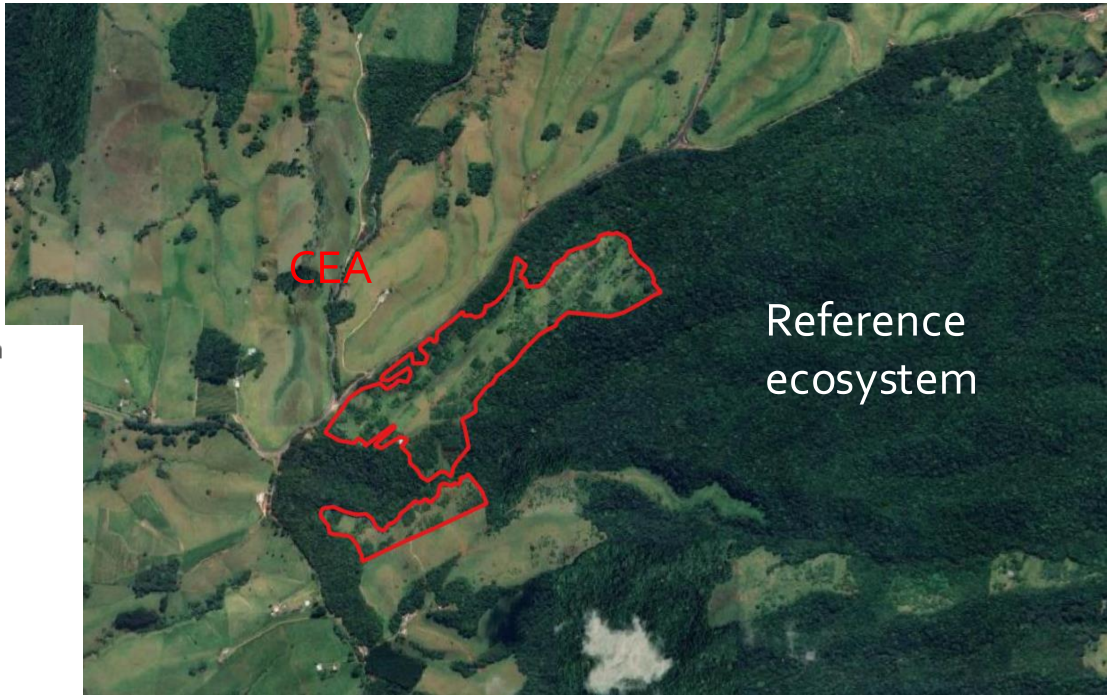


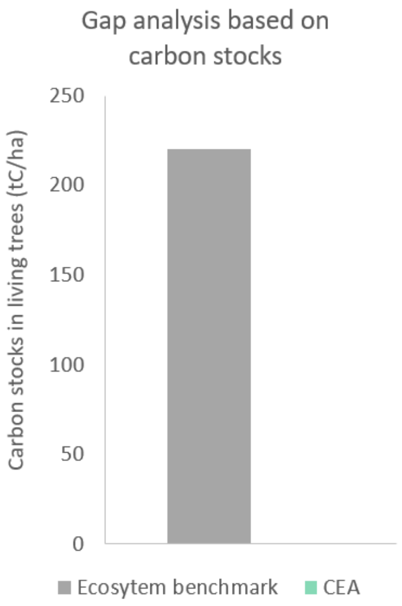
Case study 7 (QLD): Cleared agricultural land → Wet highland rainforest



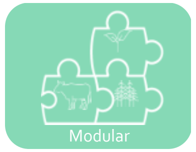
IFLM Step	Property type & size	Conservation & research, 181 ha
1a	Location	Atherton Tablelands, QLD – 1,047 mm annual rainfall
	Traditional Owners	Yirrganydji People
	Currently registered under ACCU scheme?	Woody biomass: Yes, under the reforestation and afforestation method Soil: No, but soil has been measured for research purposes
1b	Barriers limiting carbon sequestration potential	**Ecological**: Lack of niche microclimates for rainforest restoration **Biological**: Competition from introduced grass species **Physical/chemical**: Compacted soils
1c	Management activities to address barriers	Planting rainforest species (23 ha) & soil carbon sequestration following reforestation
1d	Risk based leakage assessment	Leakage risk is low – Cattle grazed on agistment (not owned by proponent). Income from carbon is sufficient to offset income from cattle at an ACCU price of $37. Proponent is committed to conservation and is unlikely to displace activities.
1e	Evidence & monitoring examples	Receipts from planting contractors Ongoing monitoring of tree survival, progression towards forest cover Affiliated research project on rainforest restoration techniques
2a	Stratify the project	Woody biomass – facilitated regeneration CEA 23 ha Soil CEA 23 ha (overlapping woody biomass)
2b	Material gap analysis (Justification of abatement potential)	CEA: 0 t C ha-1 Ecosystem benchmark: • Option 1: 220 t C ha-1 (conceptual model, based on MaxBio layer) • Option 2: old growth rainforest not cleared for at least 150 years (reference ecosystem, on property)

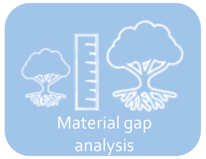
Case study 7 (QLD): Cleared agricultural land → Wet highland rainforest

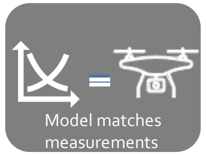




Case study 8: fire Greater Western Woodlands

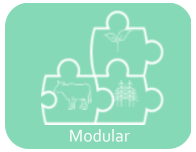


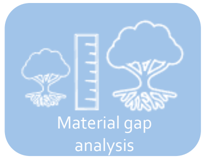


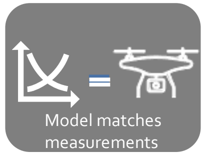


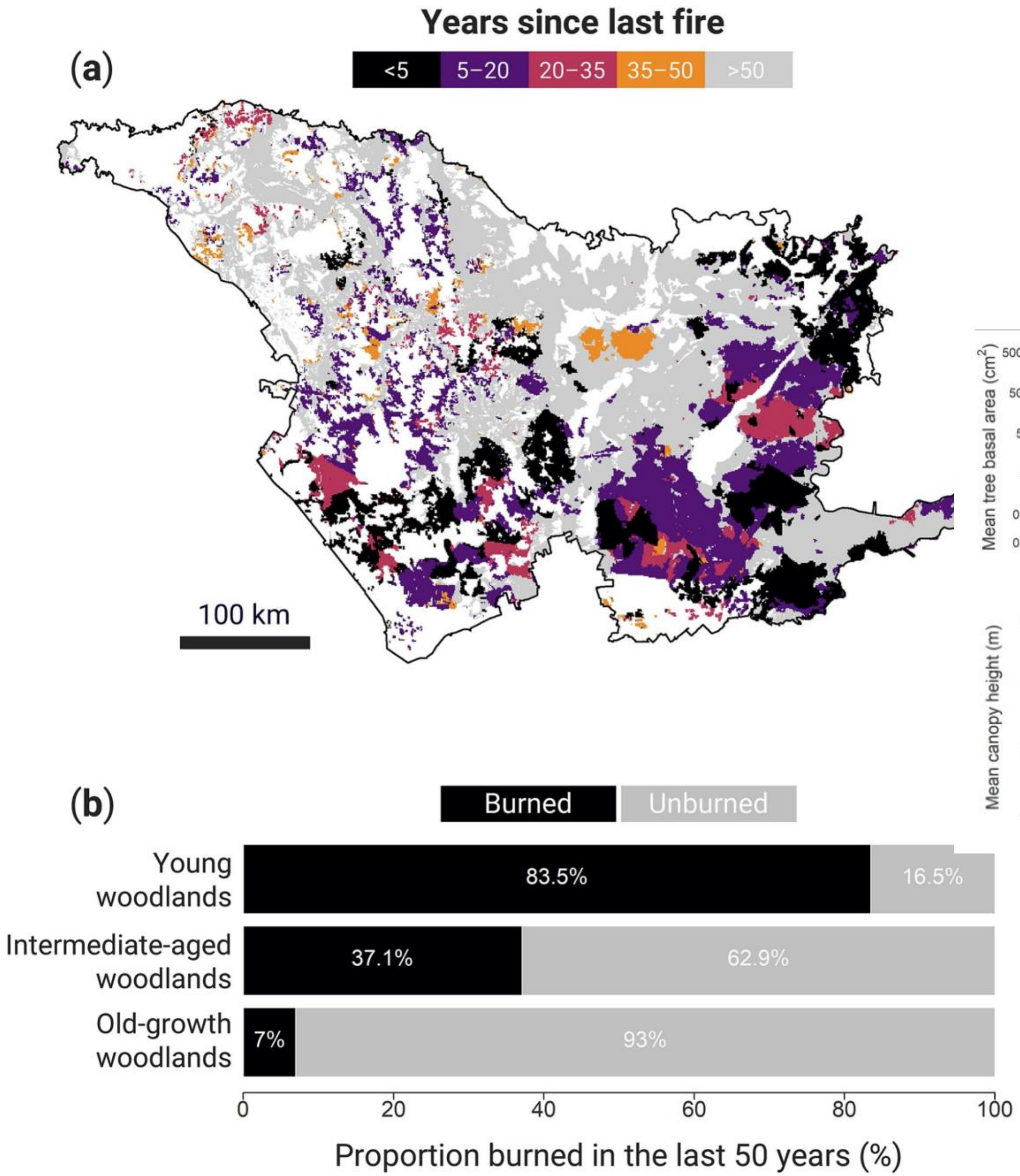
1a	Location	Greater Western Woodlands, WA
	Ecosystem	Ngadju peoples
	Traditional Owners	Various
	Currently registered under ACCU scheme?	No, this area is south of the eligible savanna fire management zone
1b	Barriers limiting carbon sequestration potential	**Ecological**: More frequent, high intensity wildfires kill mature trees, and transition the ecosystem to a lower carbon stock for decades.
1c	Management activities to address barriers	**Ecological:** Application of highly targeted planned cultural burning to reduce fuel load
1d	Risk based leakage assessment	Low
1e	Evidence & monitoring requirements	Historical fire scars, planned burning requirements
2a	Stratify the project	Stratify by veg class and burn history
2b	Material gap analysis (Justification of abatement potential)	Material difference in basal area and tree height between young (i.e. recently burnt), intermediate, and mature ecosystems.

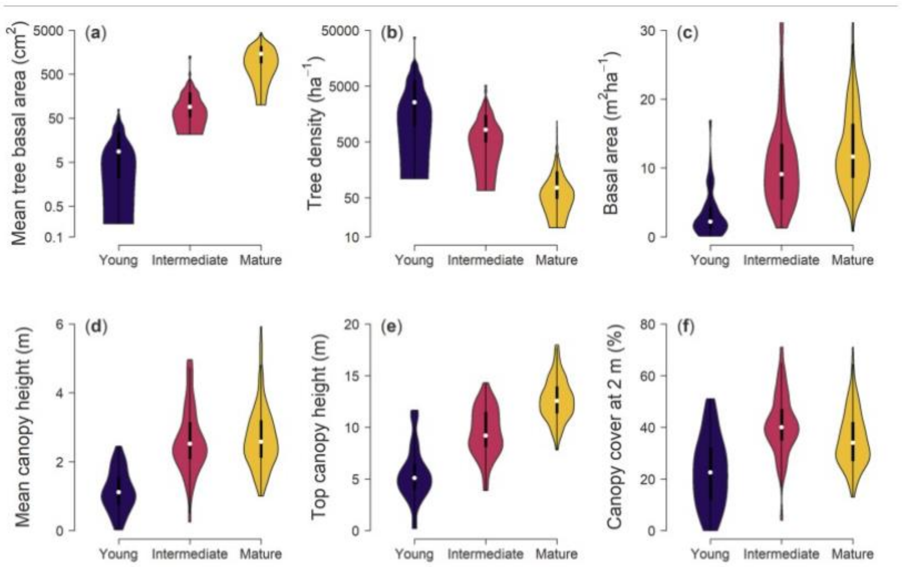
Case study 8: fire Greater Western Woodlands





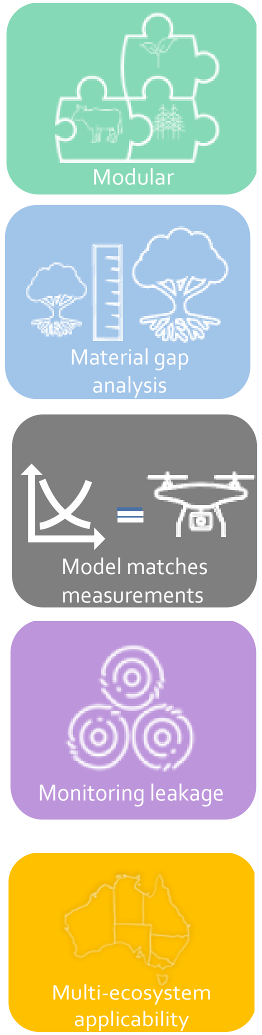


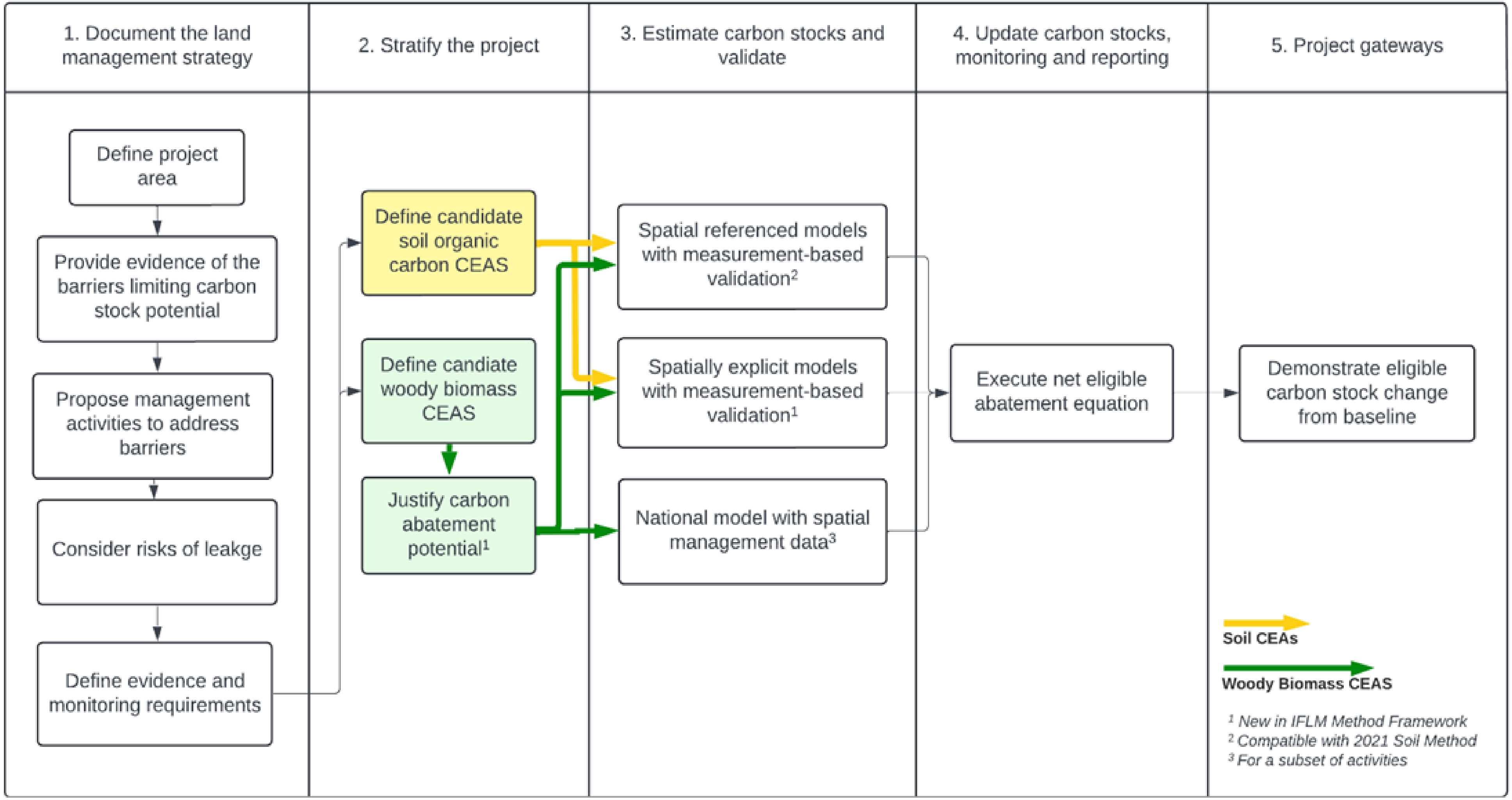




Source: Jucker et al, (2023) Using multi-platform LiDAR to guide the conservation of the world's largest temperate woodland, Remote Sensing of Environment, Volume 296,

Recap: broad architecture of IFLM





Session 2: Woody Biomass & 5-Step Process

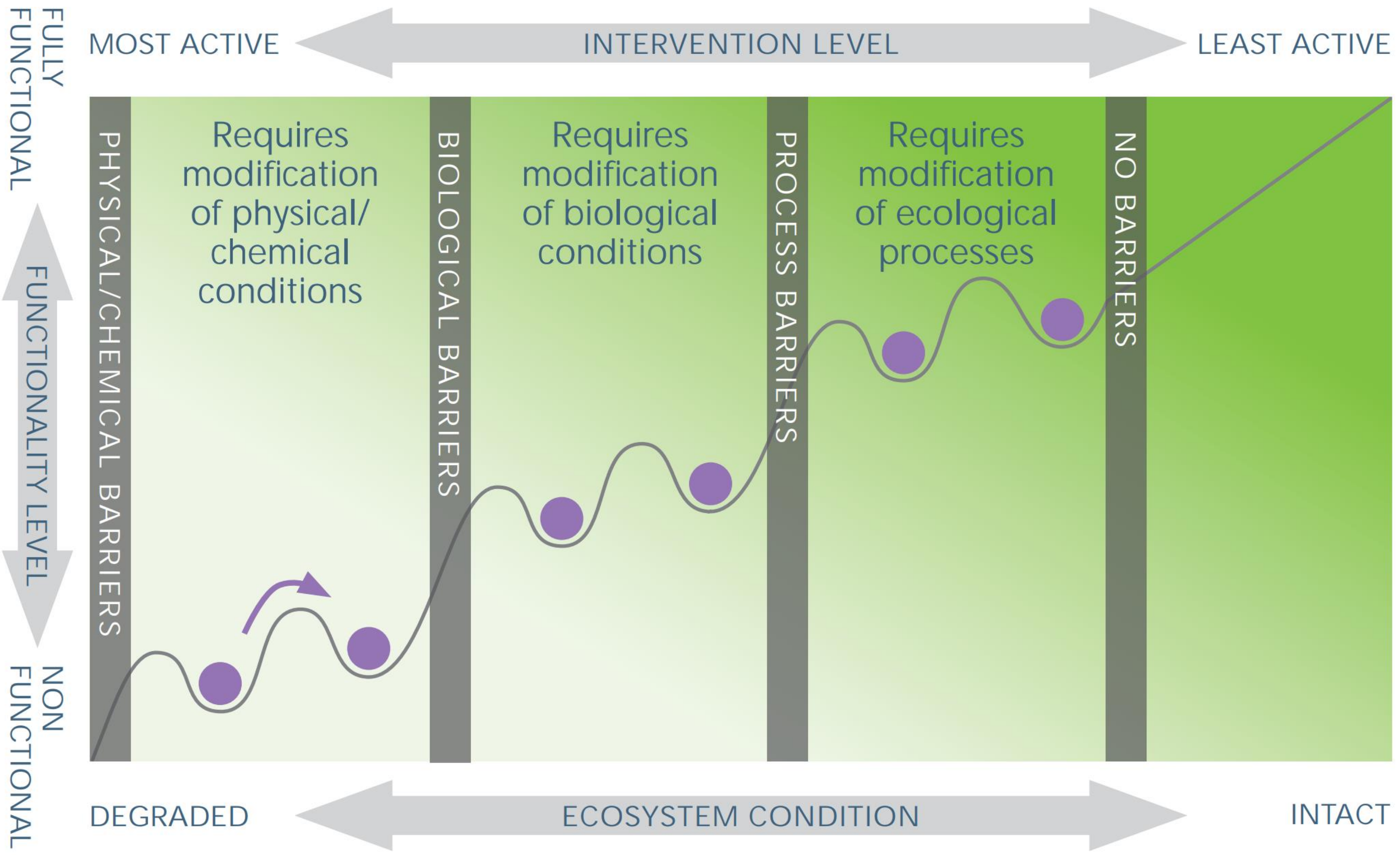
Focus Questions

Does the Society for Ecological Restoration Australasia (SERA) ecological restoration framework provide a suitable approach to analyse barriers to woody biomass regeneration and inform carbon project management activities?

What should be the key criteria for selecting ecological benchmarks or reference sites?

The gap analysis and eligible carbon stock ratio are designed to provide robust evidence of additionality. Are there any further refinements to these proposed safeguards?

Session 2: Woody Biomass & 5-Step Process

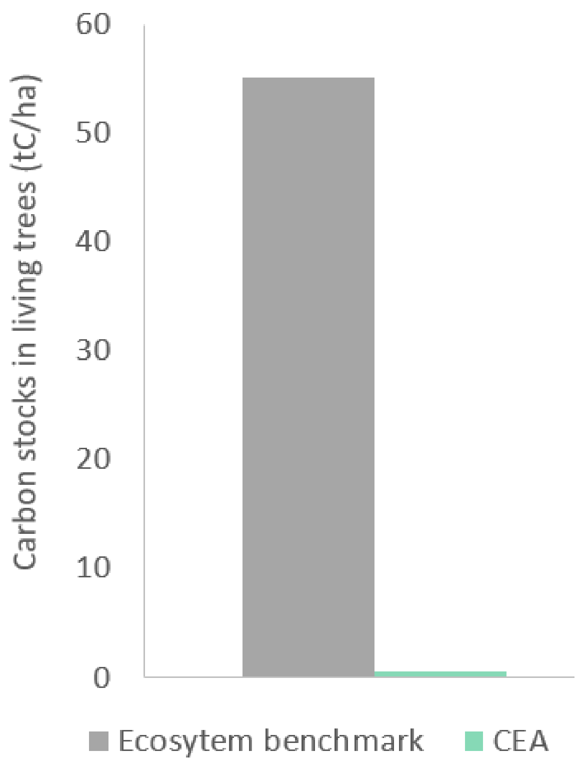


The SERA National Standards[1] describe three broad types of barriers (physical, biological or ecosystem process) that prevent ecosystems moving to high functioning, advanced ecosystem states. Barriers may require a variety of interventions and ecosystem dynamics may be complex and non-linear. When barriers are removed, the ecosystem is expected to proceed toward a high carbon state. Note that barriers are not necessarily sequential, but physical, biological and process barriers may all exist at the same time and be addressed in parallel.

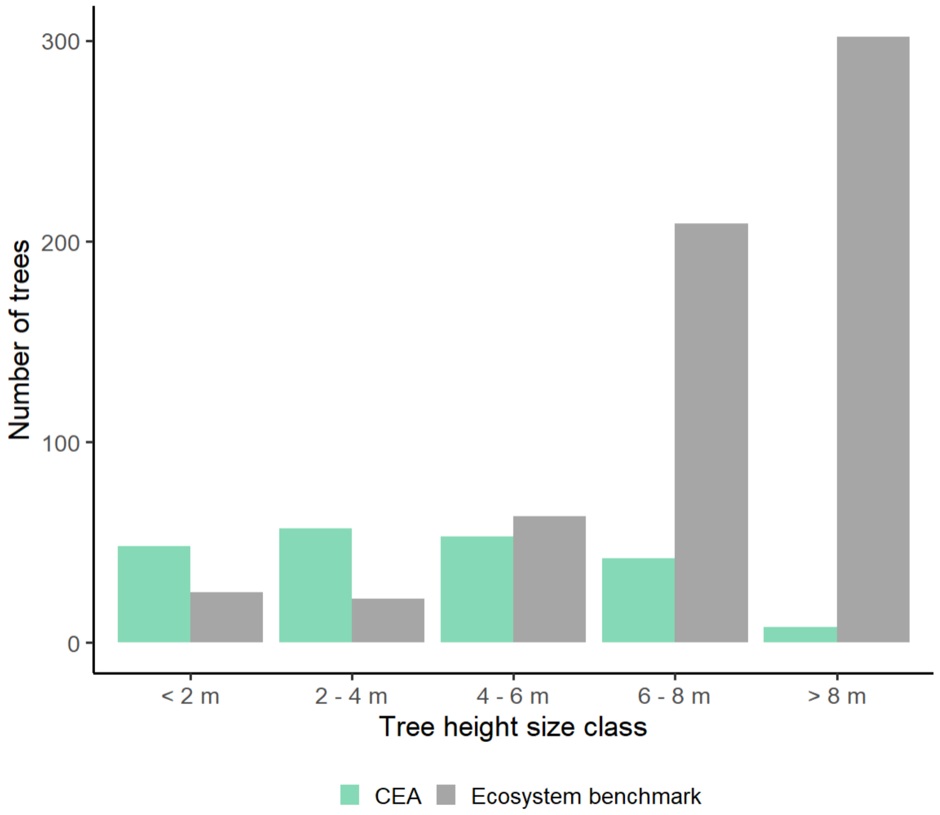
[1] Standards Reference Group SERA (2021) National Standards for the Practice of Ecological Restoration in Australia. Edition 2.2. Society for Ecological Restoration Australasia. Available from URL: Available from URL: http://www.seraustralasia.com/standards/home.html

Gap Analysis Examples

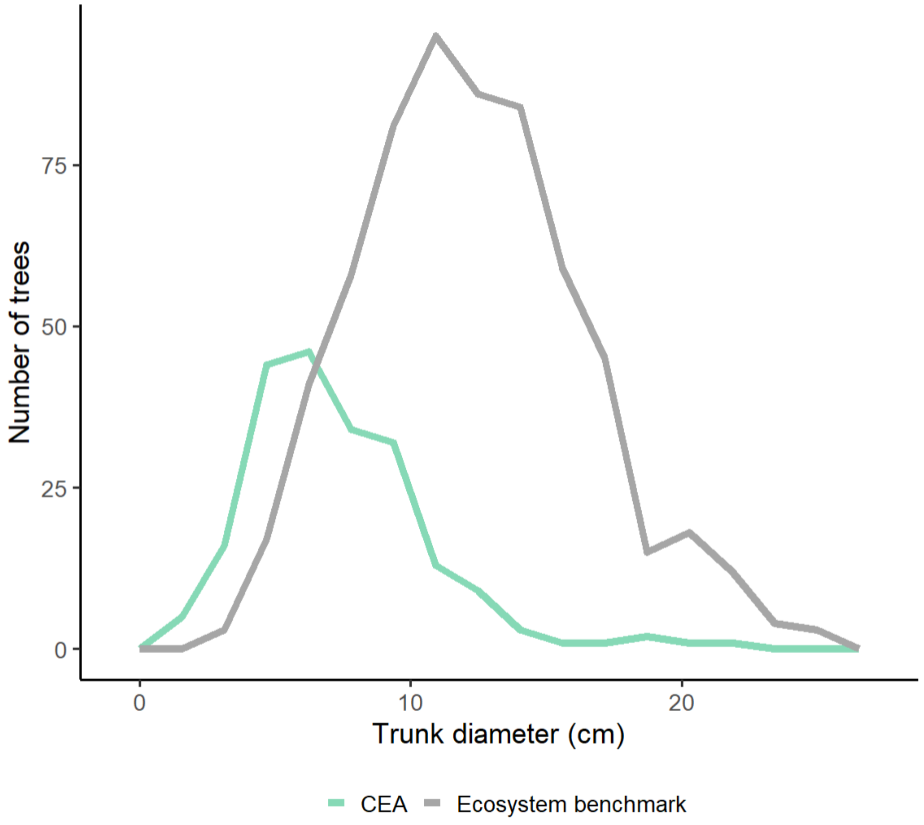
Option 1 –
maximum sustainable
carbon stock



Option 2 –
binned size data



Option 3 –
continuous size data



IFLM Case Studies

Session 3: Soil & 5-Step Process

Focus Questions

It is largely proposed to mirror the requirements from the recent Soil Carbon Method 2021 given it was recently reviewed and legislated.

However, is there an opportunity to modify the restrictions on biochar as one of the eligible management activities for soil under IFLM method?

Are there any additional considerations, including logistics, that should be considered when accounting for soil sequestration under woody biomass?

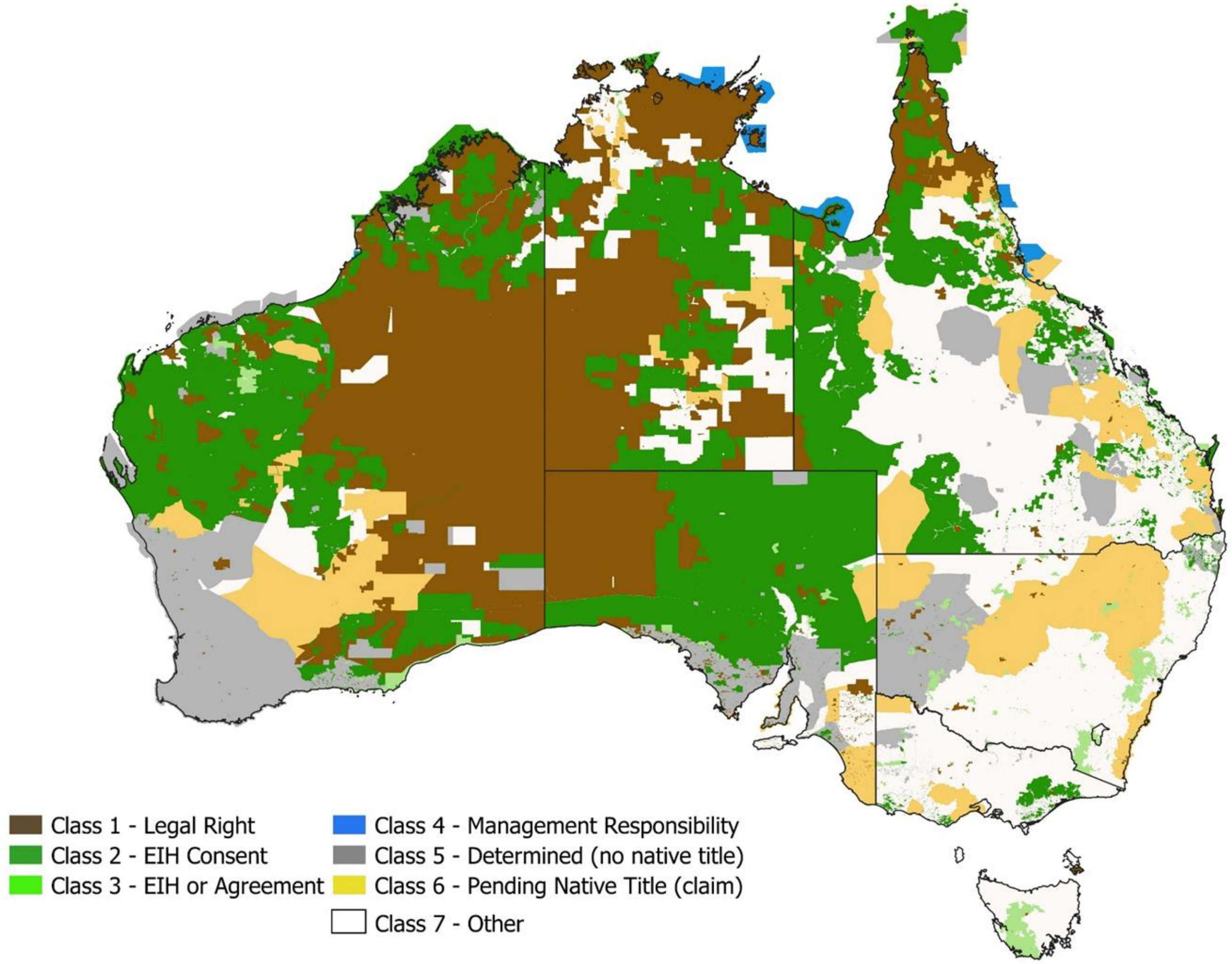
Session 4: Fire & 5-Step Process

Focus Questions

Would a regional baseline or a dynamic baseline approach be most suitable for changes to fire management?

Should there be regional restrictions on fire management as an eligible activity? Is there a need to manage the regional overlap with the savanna burning method?

Fire in IFLM


Class 1 - Legal Right
Class 2 - EIH Consent
Class 3 - EIH or Agreement
Class 4 - Management Responsibility
Class 5 - Determined (no native title)
Class 6 - Pending Native Title (claim)
Class 7 - Other

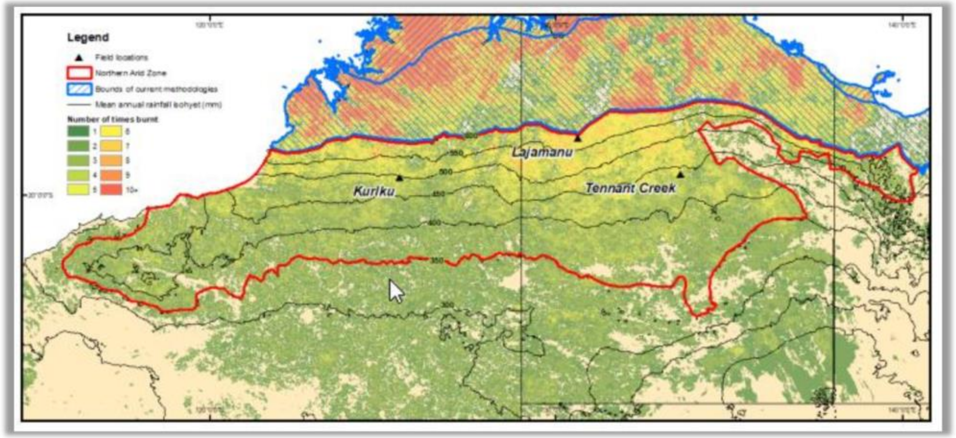
Fire in IFLM

- Initially there should be no overlap with the savanna burning method

Northern Arid Zone: 850,000 km^2

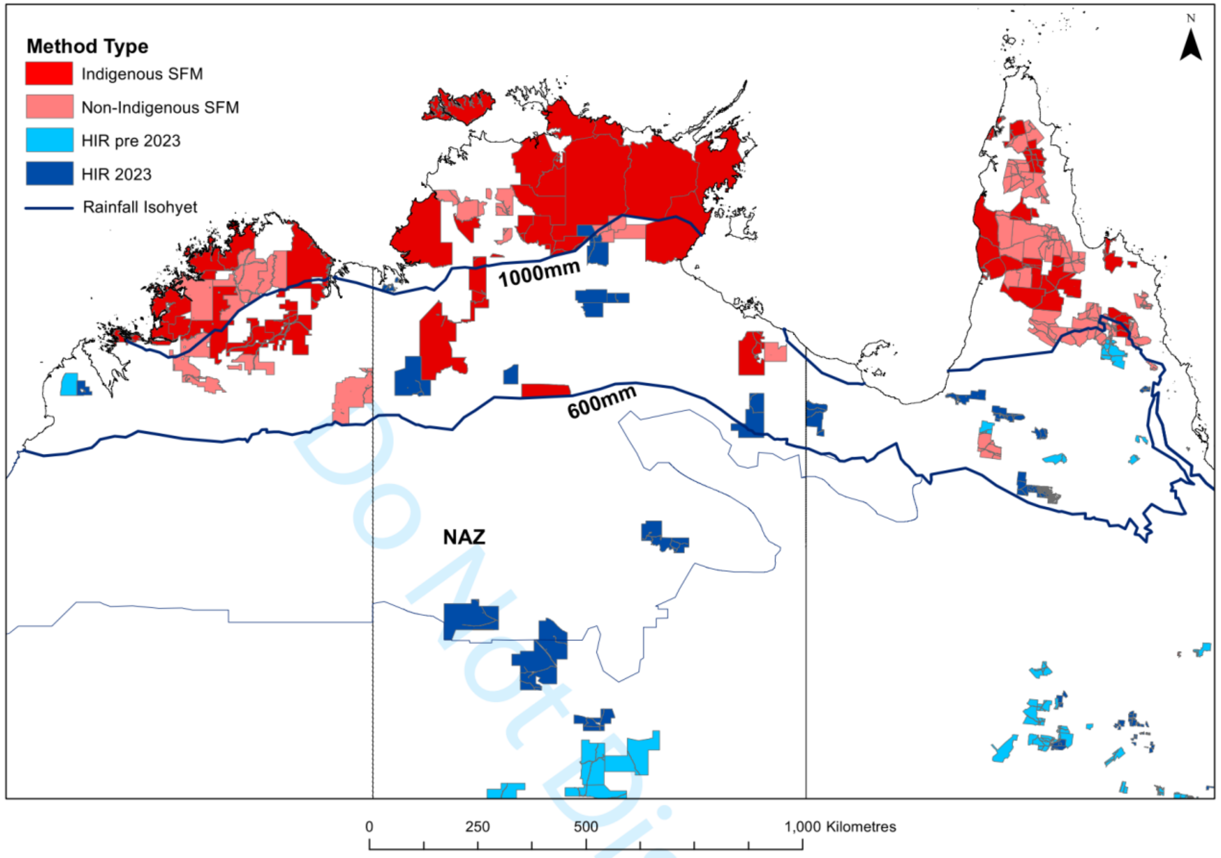
High Rainfall Zone = 400,000 km^2

Low Rainfall Zone = 700,000 km^2



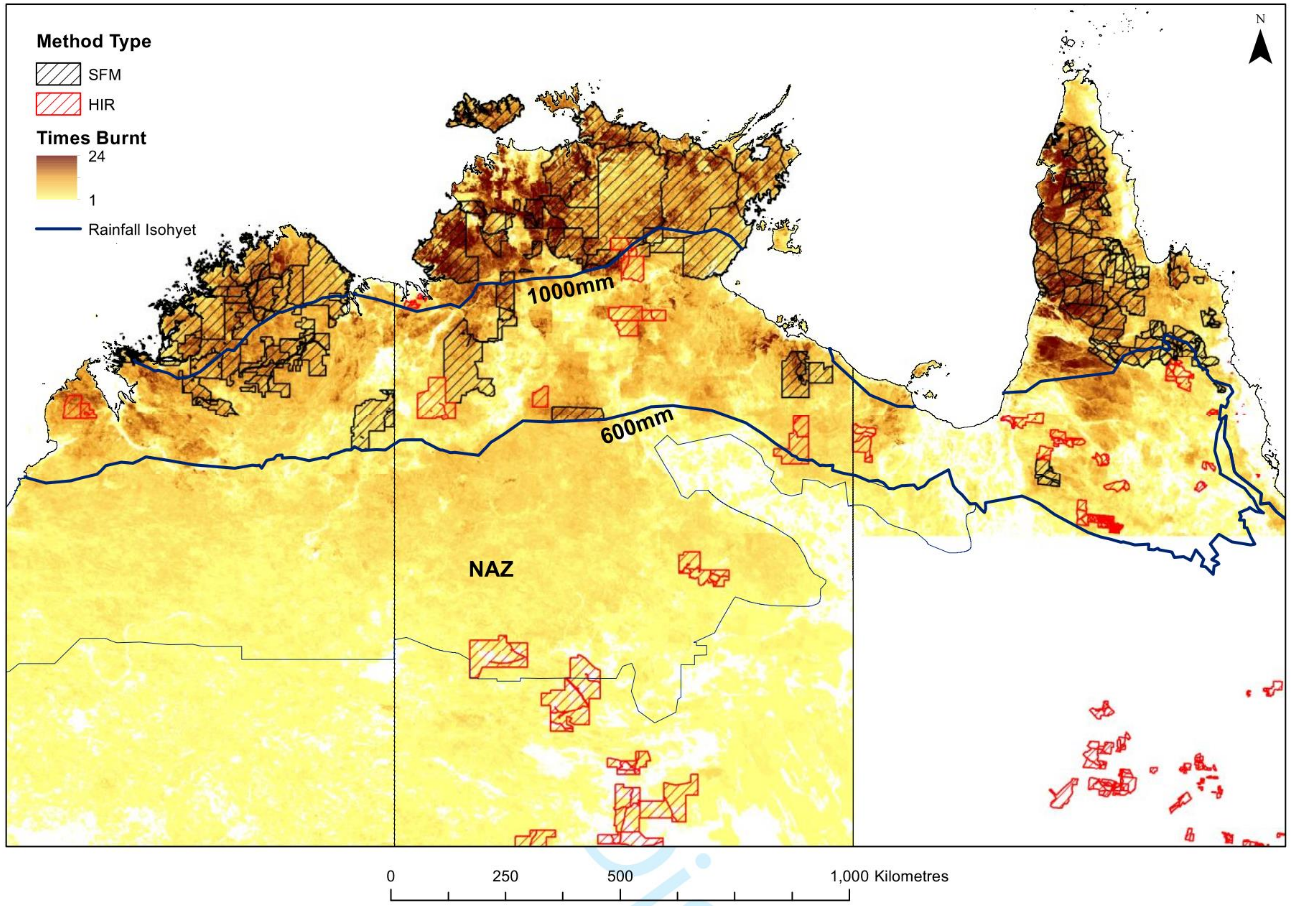
Criteria:

- ❖ Frequent fire
- ❖ Monsoonal influence
- ❖ Low Rainfall Zone Method approach
- ❖ Spinifex dominated Shrublands and Open Woodlands



Fire in IFLM

- Fire as a disturbance event and permanence management activity is already a feature in carbon farming methods



Fire in IFLM

- There could be two options to calculate baselines:
  - Option 1: gap analysis + five yearly gateway (including benchmarking of projects against regional fire return intervals)
  - Option 2: dynamic baseline based on fire probability modelling




Workshop Agenda – Day 2

	Item
9-11am	**Integrated Accounting**
11-11.30am	Morning Tea
11.30-12.30am	**Emerging Issues**
12.30-1.30pm	Lunch
1.30-2.45pm	**Risk-based leakage**
2.45-3.15pm	Afternoon tea
3.15-4pm	**Wrap up**

Session 5: Integrated Accounting – measurement & modelling approaches

Focus Questions

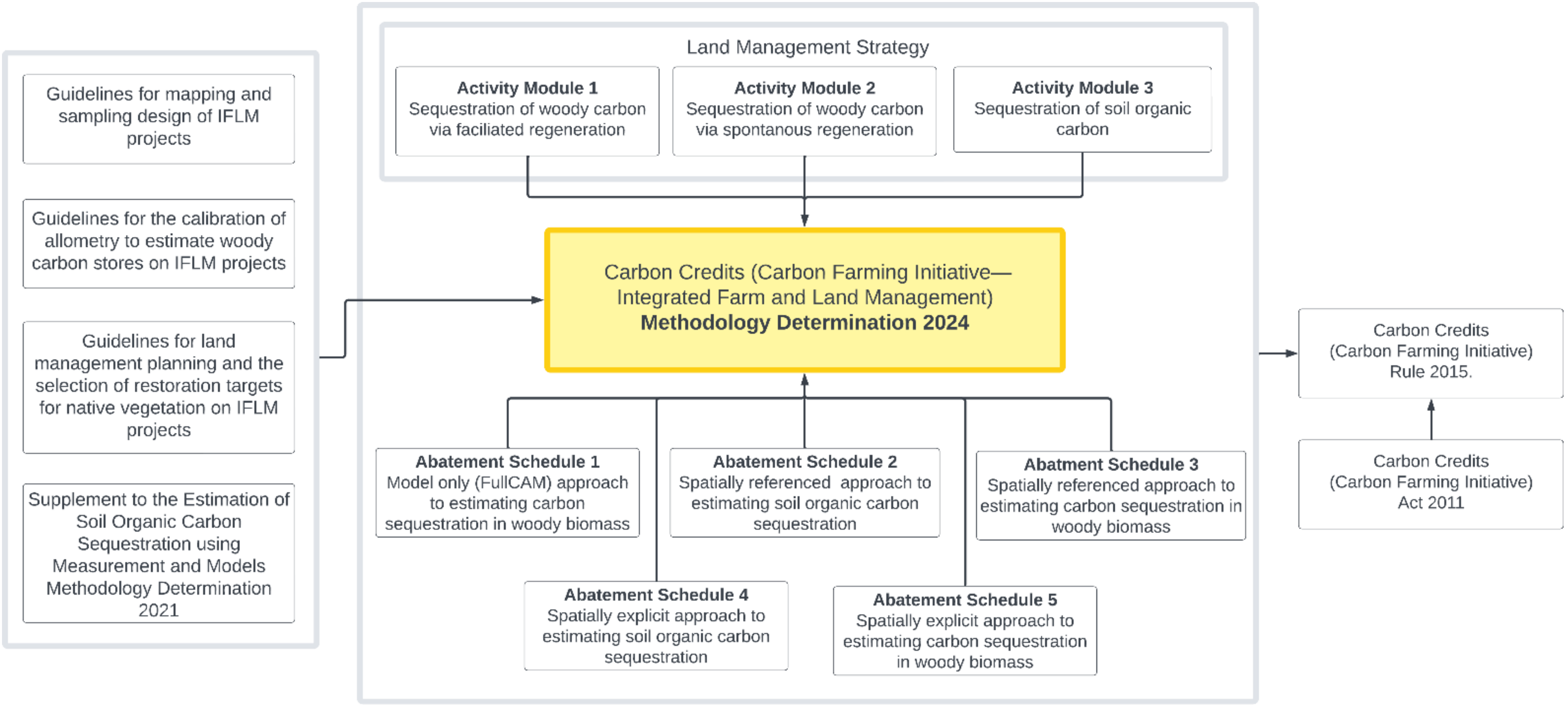
Five different Abatement Schedules are proposed for measuring and/or modelling woody biomass and soil organic carbon:

- National model – woody biomass:
- Spatially referenced models – Soil
- Spatially referenced models – Woody biomass
- Spatially explicit models – Soil
- Spatially explicit models – Woody biomass

Do these schedules provide the right breadth of options and model validation requirements?

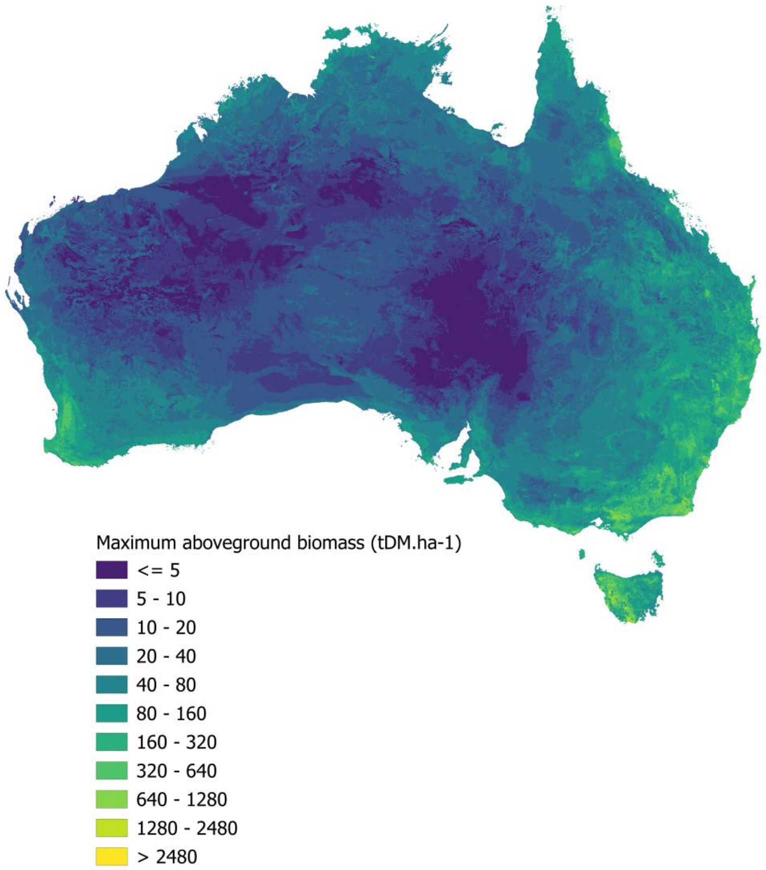
Some additional restrictions are proposed for projects opting to apply the national model (i.e. FullCAM). Is that appropriate? Should there be any targeted research or data collection to fill any gaps?

Session 5: Integrated Accounting – measurement & modelling approaches

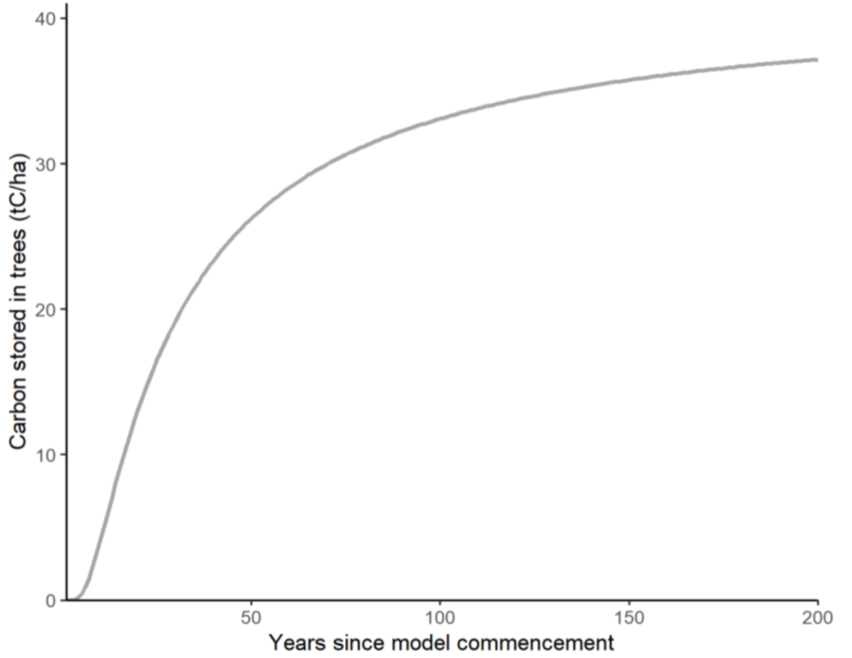


Schedule 1 - National model – woody biomass:

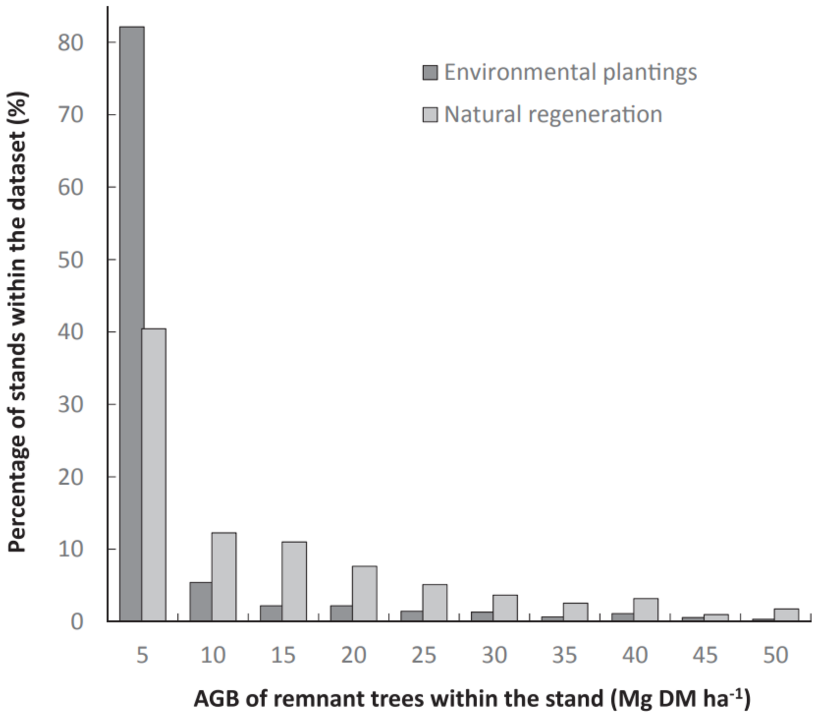
Maximum sustainable carbon stock



Growth curve of regenerating cohort



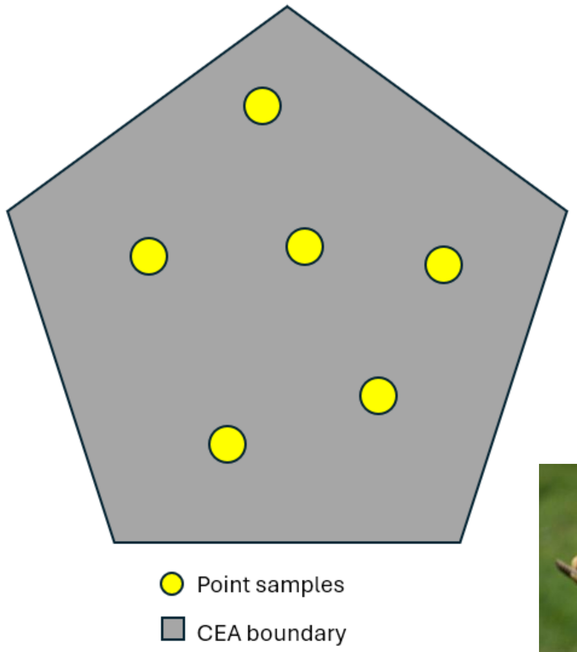
Assumptions of calibration



From: Paul & Roxburgh (2020). "Predicting carbon sequestration of woody biomass following land restoration." *Forest ecology and management* 460:117838.

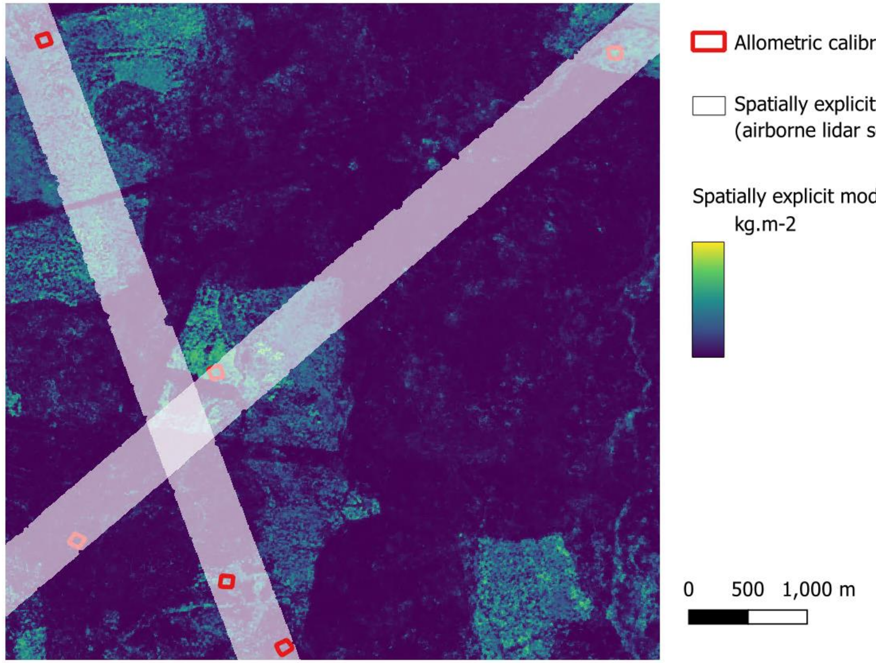
Schedules 2 & 3 - Spatially referenced models

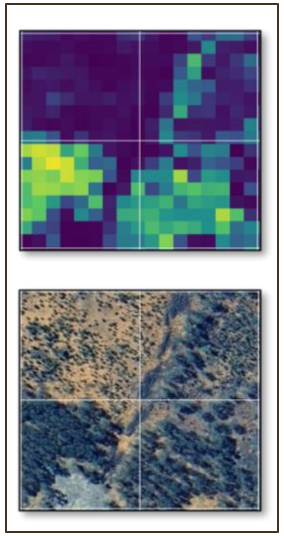
Model the average carbon stock in the CEA and multiply by the area



Schedules 4 & 5 - Spatially explicit models

Model the distribution of carbon stocks across the CEA and sum





Note: CEA boundaries not yet defined for IFLM, not shown

Session 6: Issues Emerging

Insert based on discussions on day 1

Session 7: Risk based Leakage examples

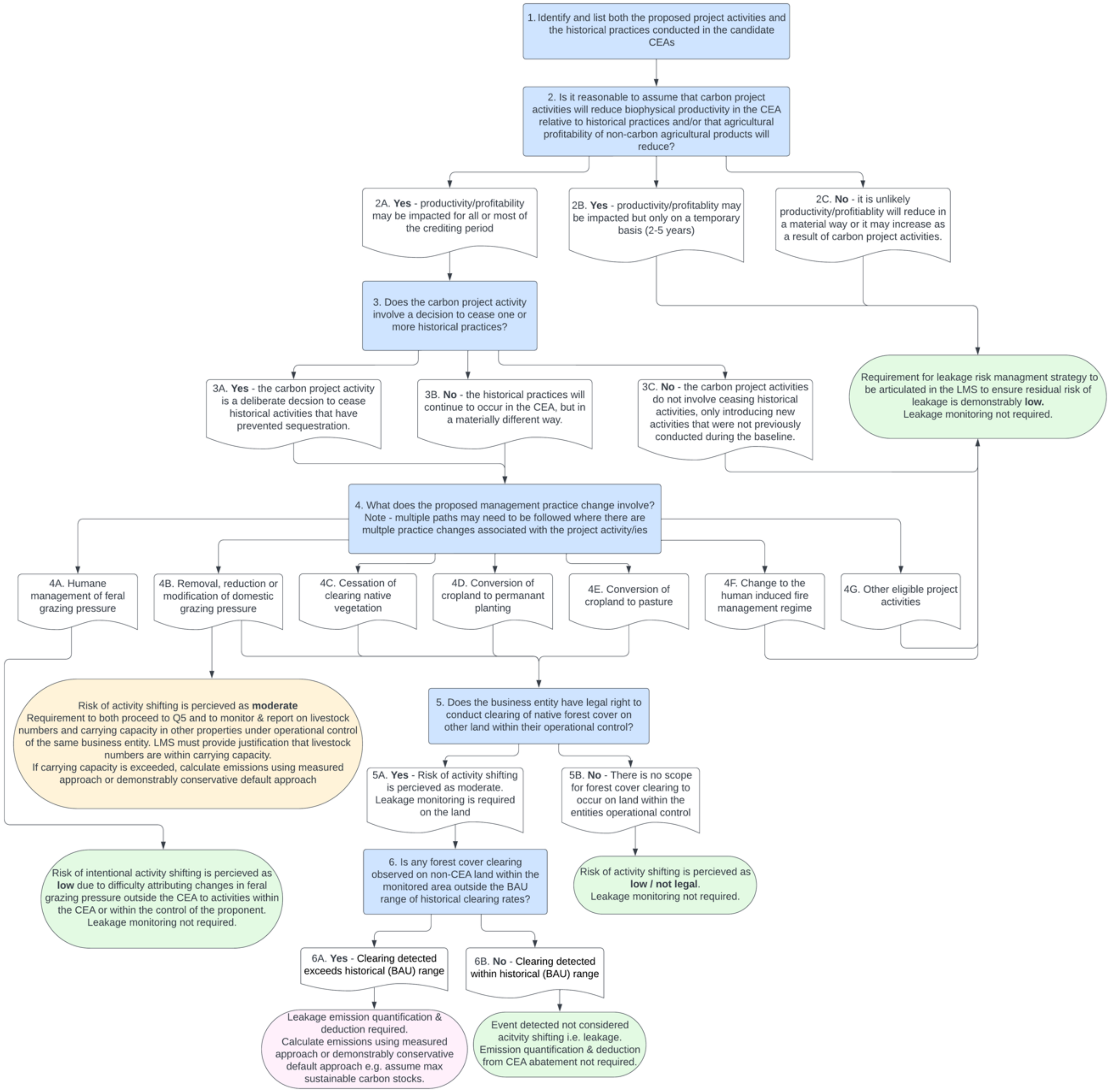
Focus Questions

What is an acceptable materiality threshold for leakage?

Is the proposed risk-based leakage assessment tool fit for purpose? Do you agree that displacement of clearing is the main risk of material leakage?

In the Australian context where national reporting of emissions takes place, is there a need for a leakage assessment at a project level? Or is leakage accounted for under existing or scheme-wide buffer deductions?

Session 7: Risk based Leakage examples



Workshop Wrap-up

Summary of discussions

Items identified for further discussion

Preliminary overview of workshop report & next steps