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Increasing Climate Ambition in Land, Forests and Ecosystems

Submission to the Agriculture & Land Sectoral Decarbonisation plan

[redacted]

Introduction:

The purpose of this submission is to ensure that the significance of recent developments in scientific understanding and international policy and practice, are taken into account in re-designing the framework for climate action in natural and agricultural ecosystems and in particular to deliver synergistic outcomes for climate and biodiversity.

Until recently, Australia paid no attention to the implications of the biodiversity crisis for the supply of every ecosystem service on which humanity relies, including the retention of ecosystem carbon stocks. Far more attention must be paid to the functional role of biodiversity in maintaining ecosystem integrity, stability and resilience and the factors that influence risks to and longevity of, carbon storage in land, forests and other ecosystems.

Policy and practice changes are needed to ensure climate action in land, forests and other ecosystems contributes high integrity, low risk outcomes to Australia's national emissions reduction targets; supports and enhances the adaptive capacity of carbon dense ecosystems; and protects and recovers resilient, long lived and relatively stable carbon stocks (reservoirs) that help stabilize our climate over the decades ahead.

The recommendations are also made in the knowledge that there is little remaining global GHG budget in which to limit warming to 1.5 degrees (Spratt & Dunlop 2021a, b), that gross emissions reductions from all sectors must be the highest priority for action and that what we do in this decade will likely determine success or failure in ensuring an equable climate close to that in which humanity evolved and thrived.

It must not be forgotten that Nature is integrally part of a complex, interacting, adaptive social, economic and Earth systems each with transition thresholds to alternative stable states. Just as integrity and resilience of natural ecosystems are fundamental to addressing climate change, failure to control fossil-fuel carbon emissions resulting in increased intensity and frequency of droughts and fires can undermine Nature's critical role (Brando et al. 2019). New forms of governance that holistically and adaptively manage all these factors will be essential.

The role and limits of Nature in climate mitigation

There is a long tail from CO2 emissions, with emissions persisting in the atmosphere for centuries. Wherever feasible, policy must foster gross emissions reductions now and from all sectors – including from loss and damage to carbon rich ecosystems as the carbon stored in them is "irrecoverable by 2050" (IPCC AR6 WG 111, chpt 7; Goldstein *et al.* 2020). In addition to keeping fossil carbon in the ground, we must do everything possible to improve the integrity, stability and resilience of ecosystems to retain existing carbon stocks and facilitate expanded carbon retention capacity.

Internationally, climate focus is increasing on the benefits of protecting and restoring natural ecosystems through so called Nature based solutions (Nbs). While welcome, the global promotion of Nbs creates a false sense that business-as-usual fossil fuel emissions can continue, with Nature picking up the bill. Any meaningful discussion of Net Zero goals must include the severe risks and dangers of assuming fossil fuel emissions can simply be offset by increased uptake of CO2 in land, forests or other ecosystems. Moreover, priorities for retaining and recovering ecosystem carbon stocks must be based on new scientific knowledge, which reveals that:

- The Mitigation value of forests and other carbon rich ecosystems resides in their ongoing capacity to sequester and store carbon.
- It is not just the rate at which carbon is input to an ecosystem (e.g. uptake by trees through photosynthesis) that matters, but also the rate of carbon output (respiration) and the carbon residence time.
- It is the size and longevity of the accumulated stock of carbon that matters most for climate mitigation.
- Biodiversity provides natural resistance, resilience and adaptive capacity to ecosystems and enables larger and longer-lived ecosystem carbon stocks. (Mackey et al 2022)

The natural carbon dynamics of ecosystems – and the factors that affect their stability and resilience – determine carbon residence time and the ability of ecosystems to resist threats that are increasing as the Earth warms (Keith et al 2021). Given that there is more carbon held in ecosystems than there is in known reserves of fossil fuels (Mackey et al 2013), it is critically important to retain ecosystems that are in good condition and improve the integrity of fragmented and otherwise damaged or degraded ecosystems to increase the stability of current and future ecosystem carbon storage.

It is scientifically incorrect to assume that geo-carbon and bio-carbon are fungible or that even within land, forest and other ecosystems, all carbon is equal. Climate policy to date has failed in a serious and fundamental way, to reflect ecosystem dynamics and understand let alone promote, the fact that maintaining and improving the integrity of all ecosystems - both agricultural and natural – is essential for effective, long term mitigation outcomes and improving the ability of ecosystems to adapt to climate

change.

Both rapid reductions in burning fossil fuels and increased synergistic climate and biodiversity action are essential for limiting warming to 1.5°C degrees,

Recommendation 1: Establish separate goals and targets for biogenic and geocarbon that seek to reduce gross emissions from all sources of emissions including from agricultural and natural ecosystems and to help retain and increase carbon storage through improved protection and conservation management of ecosystems to improve their integrity and stability.

Importance of the functional role of biodiversity in carbon retention

Failure to understand the functional role of biodiversity in climate mitigation has fostered the myth that all carbon is equal and led to perverse outcomes where biodiverse, high integrity and relatively stable and resilient ecosystems – such as older forests – are converted to agricultural land (deforestation); degraded by logging; or converted to agricultural tree crops (forest degradation). Current definitions of forest and deforestation used by agencies like the UNFCCC are distinctly unhelpful in this regard – failing to reflect the loss of forest ecosystem integrity and resilience when damage from logging or conversion takes place.

Naturally evolved patterns of biodiversity (composition, distribution, structure and abundance) are the most stable and resilient and, within their system limits, have natural resistance to threats that are increasing with climate change, particularly drought and fire. If we maintain and restore biodiversity, we lower the risk of ecosystems releasing carbon to the atmosphere. Conversely, monoculture plantings are at high risk of loss and damage and if planted to supply timber or fuel on short cycles, as is usually the case, are of negligible climate benefit – the exception being agro-ecological plantings designed to deal with severe land degradation such as salination, desertification, wetland recovery and soil erosion.

The importance of structure (age) for resisting escalating threats from severe drought and loss of soil moisture exacerbated by climate change - such as catastrophic fire - is illustrated by scientific findings that older forests are more resistant to drought and fire and reduce fire severity compared to young previously logged forests (Wilson and Bradstock 2022; report no 3 www.bushfirefacts.org).

Biodiversity plays an essential and functional role in underpinning every ecosystem service, including relatively stable carbon storage, on which we rely**.** The fact that we are facing a biodiversity crisis that is just as destabilizing to future Life on Earth as the climate crisis (IPBES 2018/19) requires that improved protection and conservation management of all natural ecosystems be at the core of climate action in land, forests and other ecosystems.

The findings of the IPBES/IPCC workshop held in 2021 should be heeded, notably that the biodiversity and climate crises amplify each other; that neither crisis can be solved unless they are solved together – 'if we fail on one we fail on both'; and that synergistic climate and biodiversity action must be encouraged. The workshop clearly identified a cascading set of priorities for synergistic action, namely improve protection first, followed by restoration of carbon and species rich natural ecosystems, "especially forests, wetlands, peat-lands, grasslands and savannahs; coastal ecosystems such as mangroves, salt marshes, kelp forests and sea grass meadows; as well as deep water and polar blue carbon habitats". (IPBES-IPCC Co Sponsored Workshop on Biodiversity and Climate Change, Workshop Report, DOI: ID.5281/zendos.4782538 and ipbes media release 10 June, 2021)

Existing programs in Australia which foster integrated climate mitigation, adaptation and biodiversity outcomes through buffering and reconnecting natural ecosystems include the largely voluntary work of initiatives like:

- Springbrook Rescue lead by the Australian Rainforest Conservation Society (sprinbrookrescue.org.au) working to buffer, reconnect and restore Gondwanan World Heritage Rainforests;

- Gondwanalink Ltd (gondwanalink.org) working to protect and restore natural ecological processes and landscapes across more than 1000kms in the south of Western Australia; and

- The Great Eastern Ranges Connectivity Initiative (ger.org.au) working with 250 partner organisations on projects spanning the entire east coast-slopes zones of Australia - some 3,600kms.

The resilience of these programs and their significance for maintaining and restoring carbon in landscapes and the adaptive capacity of ecosystems has been entirely overlooked by governments over the past decade – a tragic failure of policy for climate, biodiversity, heritage and ecosystem and community resilience that must be rectified.

Successful long term, climate mitigation in land, forests and other ecosystems can only be achieved if action is built upon the protection and restoration of biodiversity and ecosystem integrity and supported by indigenous and local communities.

Ending large scale deforestation and protecting publicly owned native forests would immediately reduce a major source of gross emissions and deliver high synergies between biodiversity, ecological integrity, climate mitigation & adaptation and climate resilient sustainable development.

Recommendation 2 & 3 encourage synergistic climate and biodiversity outcomes by:

- **improving conservation management and protection of existing native forests and other carbon dense ecosystems; followed by**

- **Fostering ecologically based restoration activities based on and supported by indigenous and local communities.**

The UNFCCC/Paris Agreement Mandate on Ecosystem Integrity

During formulation of the Paris Agreement there were calls by many Parties to embrace holistic land sector climate solutions[4] and ensure the operational provisions of the Paris Agreement support rights and protect biodiversity and ecosystem integrity. Ultimately these calls were reflected in the preamble to the Agreement and thus are still applicable to all climate actions. Recent IPCC conclusions and UNFCCC COP decisions[5] make it an appropriate time to build on the language in the preamble and fully operationalize Article 5 of the Agreement.

We are at an important inflexion point for increased understanding that biodiversity is the foundation on which successful climate mitigation action in land, forests and other ecosystems must be built in order to minimize the risk of losing ecosystem carbon to the atmosphere[6]. This understanding has brought into sharp focus the relevance of biodiversity and ecosystem integrity for the conservation and enhancement of sinks and reservoirs of all terrestrial, coastal and marine ecosystems (as per the preamble and in Article 5 of the Paris Agreement, which cross references Article 4.1(d) of the UNFCCC) . (See attached publication from Griffith University on the need for a

joint CBD/UNFCCC SBSTA work programme to fully operationalize Article 5 of the Paris Agreement).

Moreover, retaining and improving the adaptive capacity of ecosystems**,** including forests, in the face of climate and other anthropogenic pressures, depends on maintaining their biodiversity to enable continuation of the foundational ecological and evolutionary processes[7].

Retaining the adaptive capacity of natural ecosystems is explicitly called for in Article 2 of the UNFCCC which states that we must *"… achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.*" Article 7 of the Paris Agreement reinforces this adaptation objective.

IPCC AR6 WG 11 provided important insights into the potential role of the K-M GBF in helping to retain and improve the adaptive capacity of ecosystems, notably concluding:

"Safeguarding biodiversity and ecosystems is fundamental to climate resilient development, in light of the threats climate changes poses to them and their roles in adaptation and mitigation (very high confidence). Recent analyses, drawing on a range of lines of evidence, suggest that maintaining the resilience of biodiversity and ecosystem services at a global scale depends on effective and equitable conservation of approximately 30% -50% of Earths land freshwater and ocean areas, including currently near-natural ecosystems. (SPM.D.4)" And:

"Protecting and restoring ecosystems is essential for maintaining and enhancing the resilience of the biosphere (very high confidence). Degradation and loss of ecosystems is also a cause of greenhouse gas emissions and is at increasing risk of being exacerbated by climate change impacts, including droughts and wildfire (high confidence). Climate resilient development avoids adaptation and mitigation measures that damage ecosystems (high confidence). Documented examples of adverse impacts of land-based measures intended as mitigation, when poorly implemented, include afforestation of grasslands, savannas and peatlands, and risks from bioenergy crops at large scale to water supply, food security and biodiversity (SPM.D.4.2)".

Maintaining biodiversity and associated natural processes is therefore key to on-going ecosystem integrity and provides the foundation for effective climate mitigation and adaptation in the biosphere and the provision of all ecosystem services, including carbon retention, on which humanity depends.[8]

The CBD Mandate on Ecological Integrity

The protection and recovery of biodiversity and ecological integrity are pillars of the K-M GBF and of central importance to the Convention on Biological Diversity as they underpin every ecosystem service on which humanity relies. [9]

While the entire K-M GBF framework would make a strong contribution to protecting and recovering ecological integrity and thus help protect and recover biosphere carbon reservoirs and maximize the resilience and adaptive capacity of ecosystems,[10] several of the K-M GBF goals and targets are critically important for climate mitigation and adaptation and should be reflected in both Nationally Determined Contributions (NDCs) and National Biodiversity Strategy and Action Plans (NBSAPs). Goals A & B and Targets 1,2,3,4 & 8 are particularly relevant and outlined in Attachment A.

The effectiveness of climate mitigation and adaptation action in land, forests, and other ecosystems would be enhanced if, as a minimum, they were guided by and contributed to the K-M GBF goals and targets. With 30% of terrestrial and marine ecosystems needing to be protected through high quality conservation measures (Target 3) and a further 30% needing to be restored by 2030 (Target 2) in order to recover biodiversity and ecological integrity, it makes sense for these targets to inform climate action in land, forests, and other ecosystems.

Utilizing Spatial planning (Target 1) to retain and recover areas of high ecological integrity, buffer and reconnect Protected Areas, and using new conservation tools such Other Effective Conservation Measures (OECMs)[11] and Connectivity Conservation approaches,[12] would deliver high synergies and lower-risk climate mitigation and adaption outcomes. The success of these approaches is closely linked to working with indigenous and local communities to support and enhance climate resilient sustainable development, their rights, and cultural aspirations.

Recommendations 4-7:

- **Utilise the K-M GBF to increase connections between key instruments and mechanisms such as the NBSAPs of the CBD and the NDCs of the Paris Agreement.**
- **Adopt spatial planning approaches as called for in Target 1 of the K-M GBF, in which to nest all of the GBF targets and inform climate mitigation and adaption action, reduce biodiversity loss and improve ecological integrity.**
- **Recognise that the K-M GBF provides important guidance for facilitating resilient, long-lived climate mitigation and adaptation outcomes. For example, ensuring ecological "connectivity" at a landscape scale (Target 3 of the K-M GBF) will facilitate adaptation and improve ecological integrity and by buffering and reconnecting existing natural areas play an important role in enhancing and/or retaining ecological functions and services, including carbon retention.**
- **Reflect key principles of the K-M GBF that encourage holistic action, supports the rights and livelihoods of indigenous and local communities, and work with communities to deliver protection and restoration objectives essential for achieving long-term climate and biodiversity outcomes and climate resilient sustainable development.**

Accounting Reform

Successful implementation of the ecosystem provisions of the UNFCCC and the Paris Agreement and of decisions made at COP 25 (1.CP 25 para. 15) calling for integrated action to prevent biodiversity loss and

climate change; and COP 26, (CMA/3 para. 21 and 1.CP/26 para. 38), emphasizing *"* the importance of protecting, conserving and restoring nature and ecosystems, including forests …" depends upon understanding the significance of ecosystem integrity for stable long term carbon storage and the overall health of the biosphere.

Current UNFCCC accounting rules on land and forests (LULUCF) are unsuited for encouraging integrated climate and biodiversity action or for guiding priorities for Nbs in NDC's (Keith et al 2021). At a time when it is critical to implement the ecosystem provisions of the Paris Agreement and the Convention, revised approaches to carbon accounting in land forests and other ecosystems are urgently needed.

Fortunately, the new ecosystem accounting framework developed and adopted last year by the UN Statistical Commission (the UNSEEA-EA) can fill crucial information gaps in UNFCCC approaches, enabling the integrity of ecosystems to be assessed against a natural reference level and countries to include and value the ecosystem service of carbon retention, based on the relative condition (or integrity) of ecosystems, in the balance sheets of their National Accounts. By doing so the superior value of ecosystems with high integrity and the recovery potential of those that are not, can be fully revealed. Already 37 countries, including Australia are moving to implement the UNSSEA-EA and it is being strongly supported by the G7 as an important bridge between the Rio Conventions.

This new ecosystem accounting framework reveals the importance of maintaining and restoring ecosystem integrity for achieving the goals of all the Rio Conventions and all of the SDG's but in particular SDG 15 (Life on Land). The increased focus on integrating climate and biodiversity action provides an opportunity to deliver multiple societal goals through ensuring the integrity of ecosystems.

Recommendation 8: Utilise the UNSEEA-EA framework to develop methods and approaches to accounting that encourage synergistic/holistic climate and biodiversity action to help maintain and improve the integrity of ecosystems and reduce the risk of losing ecosystem carbon stocks to the atmosphere.

The importance of ecosystem integrity for carbon retention

The IPCC Sixth Assessment Report, Mitigation of Climate Change, Chapter 7, Agriculture, Forestry and Other land Uses (AFOLU) reached important conclusions for synergistic climate and biodiversity action including that: 'actions that protect offer the highest total and per area mitigation value of any action in the AFOLU sector'; 'the protection of high biodiversity ecosystems such as primary forests delivers high synergies with GHG abatement'; 'most mitigation options are available and ready to deploy and emissions reductions can be unlocked relatively quickly, (through) the protection of natural ecosystems'; and 'avoiding the conversion of carbon-rich primary peatlands, coastal wetlands and forests is particularly important as most carbon lost from those ecosystems is irrecoverable through restoration by the 2050 timeline of achieving net zero carbon emissions (Goldstein et al. 2020)'.

The IPCC 6th Assessment Report of Working Group II on Impacts, Vulnerability and Adaptation, Summary for Policy Makers (SPM) concluded that 'building the resilience of biodiversity and supporting ecosystem integrity can maintain benefits for people, including livelihoods, human health and well-being and the provision of food, fibre and water, as well as contribute to disaster risk reduction and climate change adaptation and mitigation'; and that 'protecting and restoring ecosystems is essential for maintaining and enhancing the resilience of the biosphere' . The SPM also supported the need to protect up to 50% of the planet to improve the health of the biosphere. "Recent analyses, drawing on a range of lines of evidence, suggest that maintaining the resilience of biodiversity and ecosystem services

at a global scale depends on effective and equitable conservation of approximately 30%-50% of Earth's land, freshwater and oceans, including currently near natural ecosystems…"

Understanding the importance of biodiversity and ecosystem integrity for climate mitigation requires a deeper appreciation of the functional role of biodiversity in underpinning ecological processes and the provision of all ecosystem services including the ecosystem service of carbon retention. Ecosystem integrity affects the ability of all ecosystems to store carbon over long periods of time.[13]

The definition of ecosystem integrity adopted by the UN Statistical Commission in its System of Economic and Environmental Ecosystem Accounts is useful:

"The system's capacity to maintain composition, structure and function over time using processes and elements characteristic for its eco-region and within a natural range of variability. The system has the capacity for self-organisation, regeneration and adaptation by maintaining a diversity of organisms and their interrelationships to allow evolutionary processes for the ecosystem to persist over time at the landscape level. Ecosystem integrity encompasses the continuity and full character of a complex system."

Notably, the IPCC defined ecosystem integrity as "*the ability of ecosystems to maintain key ecological processes, recover from disturbance, and adapt to new conditions*" (IPCC AR6 WG11, SPM footnote 50).[14]

Actions that help retain and recover ecosystem integrity, including the protection and recovery of the natural composition, abundance, and structure of biodiversity, contribute to ecosystem integrity and underpin the critically important ecosystem service of carbon retention, reduce the risk of GHG release to the atmosphere, and improve the longevity of carbon storage. Improving ecosystem resilience and resistance to threats that are increasing with climate change will help to conserve and recover carbon reservoirs in the Biosphere and improve their adaptive capacity[15]— both key goals of the UNFCCC and Paris Agreement. See attached IUCN WCPA CCC Technical that includes an illustration of how to reflect ecological integrity and its relevance for carbon retention in forests.

Recommendation 8: Prioritise improved protection and conservation management of high integrity carbon dense ecosystems because their carbon stocks and biodiversity are irrecoverable by 2050, followed and supported by, restoration action that improves ecological integrity at a landscape scale.

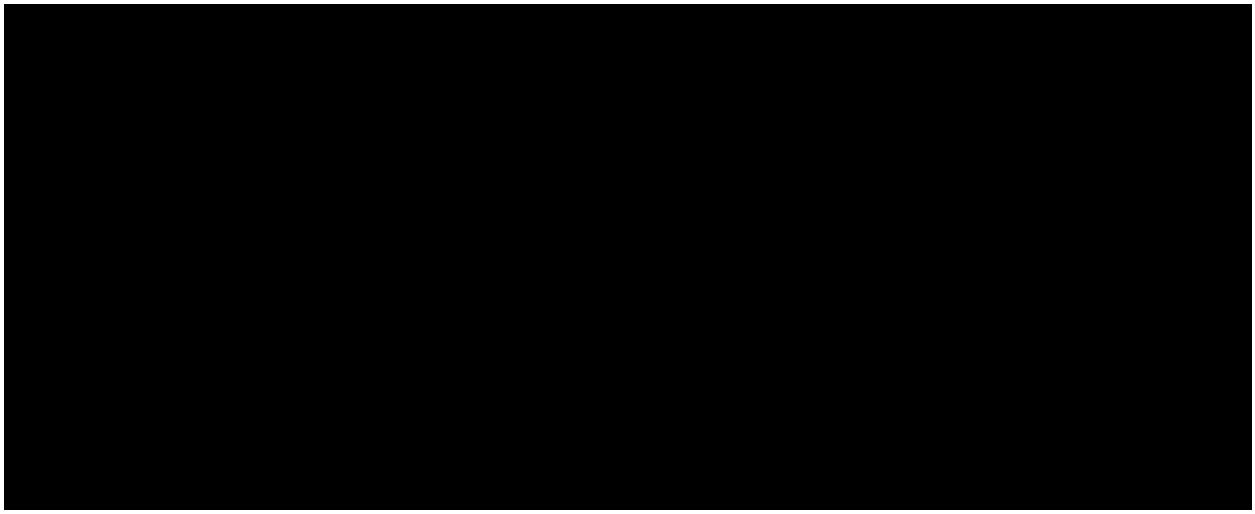
Conclusions

The ecosystem service of carbon retention, together with every other ecosystem service, is dependent on the protection and restoration of biodiversity. Given the functional role of biodiversity in ecosystem processes, biodiversity protection and restoration is essential for conserving carbon reservoirs in the biosphere and achieving the mitigation goals of Article 4.1(d) of

the UNFCCC and Article 5 of the Paris Agreement.

Improving the natural adaptive capacity of ecosystems and the services they provide is key to delivering the adaptation goals of Article 2 of the UNFCCC and Article 7 of the Paris Agreement.

Future Climate mitigation must support climate adaption. It can do so by ensuring the integrity of all ecosystems including forests and oceans. In doing so the Government would deliver immediate and cost-effective benefits for biodiversity, climate mitigation, adaptation, and the SDGs and help achieve the goals of the CBD, UNFCCC, and the Paris Agreement.



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