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Forum Essay

The need for a comprehensive reassessment of the Regional Forest Agreements in Australia

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Abstract. Regional Forest Agreements (RFAs) are State–Federal agreements underpinning the management of the majority of Australia's commercially productive native forests. Introduced between 1997 and 2001, they were designed to deliver certainty to forest industries while, simultaneously, guaranteeing environmental protection, including the conservation of biodiversity. Using examples, we argue that RFAs in some jurisdictions have failed to do either. We strongly recommend a comprehensive reassessment of RFAs. This is needed to: (1) take into account significant new knowledge on forest ecology and management that has been gathered in the past 20 years, including updated prognoses for some critically endangered species; (2) better evaluate the full range of wood and non-wood products and services provided by forests; (3) accommodate new methods of forest inventory and more environmentally sensitive silvicultural systems; and (4) better account for the impacts of natural disturbances, such as fires, on the area available for logging, sustained yield, and forest ecosystem integrity *per se*. Without a substantial overhaul of the RFAs, there is a significant risk of undervaluing the full range of native forest values, exacerbating species declines, and permanently damaging forest ecosystems.

Additional keywords: endangered ecosystems, endangered species, forest biodiversity conservation, forest management, forest policy.

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Introduction

Regional Forest Agreements (RFAs) are Federal–State Government agreements defined as '… 20-year plans for the conservation and sustainable management of Australia's native forests' (Department of Agriculture and Water Resources 2015). RFAs cover the main native production forestry regions of Western Australia, New South Wales, Victoria and Tasmania (Fig. 1). The broad aim of RFAs is to 'provide certainty for forest-based industries, forest-dependent communities and conservation' (Department of Agriculture and Water Resources 2015). This was to be achieved through Comprehensive Adequate Representational (CAR) reserves and Ecologically Sustainable Forest Management across the whole forest estate. That is (paraphrasing the Hawke Review in 2009 (Department of the Environment Water Heritage and the Arts 2009)), RFAs are designed to help manage forest resources to maintain environmental outcomes, while at the same time delivering economic and resource certainty to the forest industry.

RFAs were signed between 1997 and 2001, and their 20-year terms are coming to an end. As part of streamlining environmental regulation and dispensing with so-called 'green tape', some people have advocated rapid approval of a further 20 years of RFAs with little or no review. However, we suggest that simply re-signing RFAs is inappropriate without considering the major changes that have occurred in native forests since 1997. In addition, major deficiencies identified by other authors with the original RFAs (e.g. Calver *et al.* 1998; Dargavel 1998; Horwitz and Calver 1998; Kirkpatrick 1998; Musselwhite and Herath 2005; Brueckner *et al.* 2006) have not been rectified. Such an assessment must review existing and emerging values of native forests and contain a full appraisal of new scientific information, particularly existing and emerging threats in native forests. We illustrate our concerns using examples from a range of jurisdictions, but in particular the mountain ash (*Eucalyptus regnans*) and alpine ash (*Eucalyptus delegatensis*) forests within the RFA for the Central Highlands of Victoria.

Major inherent problems with the Regional Forest Agreements

We argue that there are several fundamental problems with the implementation of the RFAs, which arise largely from being designed to provide certainty to industry for long-term access to native forest to produce timber for sawmilling and pulpwood for paper production (see Musselwhite and Herath 2005). Attempts to produce certainty are understandable from an industry perspective, to facilitate investment and forward planning.

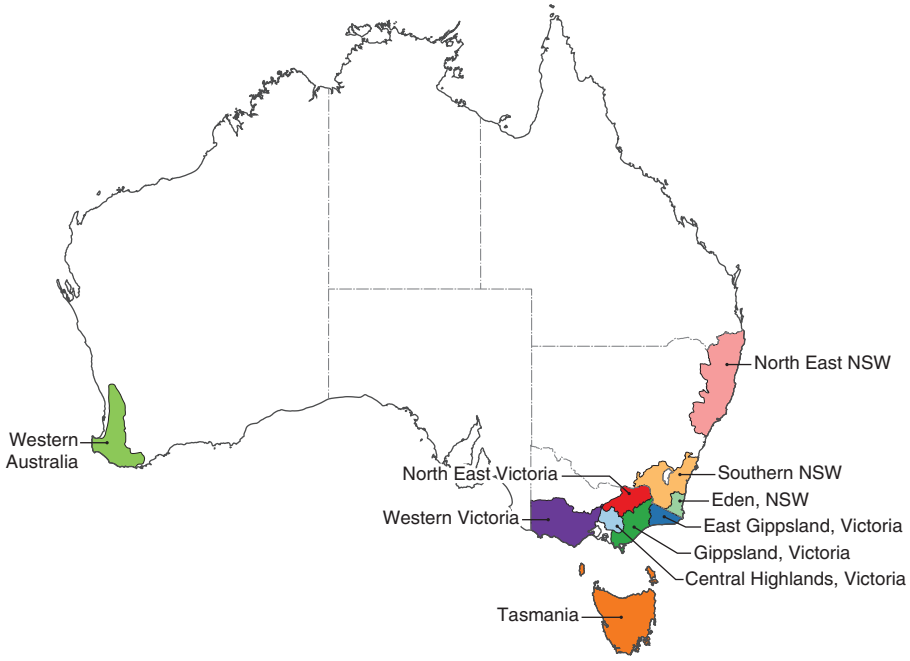

Fig. 1. Location of areas covered by Regional Forest Agreements in Australia.

However, this has the potential to effectively exclude key participants in discussions on forest management (Brueckner *et al.* 2006), divert attention from non-wood values (Dargavel 1998; Musselwhite and Herath 2005) and fail to account for existing and emerging threats (Kirkpatrick 1998). Indeed, we suggest that attempting to 'lock-in' long-term access to forest resources for industry has at least five significant problems.

The need to account appropriately for new values of native forests

Over the last 20 years, the impacts of climate change and global awareness of the issue has resulted in a significant increase in the understanding of non-wood values, such as carbon and water from native forests. Agreements drawn up 20 years ago do not adequately account for the balance of competing forest resources now, let alone those in 20 years' time. As an example, native forests have enormous carbon storage potential and how they are managed has significant implications for the magnitude of greenhouse gas emissions generated from native forest (Keith *et al.* 2014; Keith *et al.* 2015) and for tackling dangerous climate change (Mackey *et al.* 2013). Native forests may be extremely valuable in a financial sense, depending on the carbon pricing, carbon offsetting or other mechanisms associated with attempts to either limit carbon emissions and/or maximise the amount of carbon stored in forests (Macintosh *et al.* 2015). Indeed, the carbon storage values of forests under RFAs may exceed the direct financial values of native forest for timber and paper products and, unlike logging, carbon storage is generally not in conflict with managing the forests for other values such as water, biodiversity, and tourism. Biomass and its use in energy generation is another emerging product of native forests that needs to be properly evaluated in a carbon emissions context (Keith *et al.* 2015; Macintosh *et al.* 2015).

Water production is a further example of the importance of non-wood values from native forests, particularly in south-western Western Australia and south-eastern Australia where there is strong evidence of declining rainfall (Cai and Cowan 2008). Indeed, the value of native forests for water production may exceed timber and pulpwood values. This is important as logging is in conflict with maximised water yields from native forests (O'Shaughnessy and Jayasuriya 1991; Viggers *et al.* 2013).

The need to properly account for multiple existing non-wood values of native forests

When RFAs were first mooted, several authors highlighted the importance of taking account of multiple existing non-wood values (e.g. Dargavel 1998), including social values of native forests (Coakes 1998; Musselwhite and Herath 2005). These concerns do not appear to have been addressed in the past two decades. Moreover, in the 20 years since the RFAs were drafted, the economic evaluation and emphasis placed on many non-wood resources have changed significantly. We suggest that proper forest resource and financial accounting needs to be used to assess non-wood values and therefore accompany a comprehensive overhaul of the RFAs. The accounting methods developed by the United Nations – System of Economic and Environmental Accounts (SEEA: United Nations 2012) – would be a useful template to underpin an appropriate assessment of a greater array of forest values than currently characterise RFAs. A framework such as the SEEA approach would enable the incorporation of updated information. For instance, initial environmental accounting procedures that we have recently commenced indicate that the per-hectare water value of mountain ash forest in the RFA region is substantially greater than that of the timber and pulpwood (Keith, D., Vardon, M., and

Lindemayer, D. B. unpubl. data). Even modest carbon pricing further accentuates the differences between non-wood and timber and pulpwood values.

The need to reassess the economic basis for native forest logging industries

Even if the scope of forested landscape values were not expanded in a revision of the RFAs and non-wood values of native forests continue to be ignored, major reassessments are required of the economic value of the native forest industry in many regions. The RFAs were explicitly mandated to deliver financial certainty to the native forest industry. Yet, in some cases they have failed to do this. For example, in the East Gippsland RFA in Victoria, the State Government body responsible for native forest logging admitted in a submission to Cabinet that logging is not profitable and has not been for many years, losing AU$5.5M per annum (after the distribution of corporate overheads) (VicForests 2013).

The need to accommodate new scientific information on environmental threats

We suggest that, by providing certainty to industry through guaranteed long-term timber supply, the RFAs have resulted in government policy and industry inertia that limits timely response to new or recently recognised threats that can undermine forest health, alter key forest ecosystem processes, reduce timber yields, and threaten key elements of the biota that RFAs were designed to protect. Almost 20 years ago, Kirkpatrick (1998) suggested that a failure to properly address threats was a major deficiency of RFAs. This appears to remain the case. As a recent example, Taylor *et al.* (2014) demonstrated that clearfell logging of mountain ash forest can increase the risk of high-severity crown-scorching fires, which can kill stands of trees. Logging therefore has the potential to lead to major changes in key processes that govern not only the age structure of forests, but ultimately the persistence of this forest type *per se* (e.g. if the frequency of high-severity fire is increased) (Burns *et al.* 2015). The wet forests of Victoria are not alone in this regard, as Jackson (1968) similarly concluded that younger wet eucalypt forests in Tasmania are more flammable than mature forests. The key issue is that there is currently no scope within RFAs to incorporate this new knowledge, or to plan for future threats using newly acquired knowledge. The current RFA approach also lacks the agility to deal with other kinds of emerging threats. For example, recent work in Tasmania suggests that invasive animals such as the sugar glider (*Petaurus breviceps*) invade recently logged areas and prey on critically endangered species such as the swift parrot (*Lathamus discolor*) (Heinsohn *et al.* 2015). Changes to logging practices, particularly where forests are cut relative to places inhabited by the swift parrot, are urgently required to conserve this species, but this demands much more flexibility within RFAs than is currently the case.

Other kinds of threats are emerging in forests under RFAs and may require significant changes in forest policy to adequately address them. Climate change is a prominent example: the timeframe for RFAs is likely to be too long to enable flexibility in response to the impacts of changing climate on forest ecosystems and industries. Climate change effects have been implicated in widespread tree mortality in many forest types globally (Anderegg *et al.* 2013; Bennett *et al.* 2015) and also appear to be important in Australia, with major implications for forest growth, productivity and timber yields (Wood *et al.* 2014), as well as populations of key ecosystem structures, such as large old trees. For instance, the significant reduction in annual precipitation, together with a significant drawdown in groundwater (Kinal and Stoneman 2012) may threaten jarrah (*Eucalyptus marginata*) forests in south-western Australia, with trees in some areas potentially failing to reach the dimensions they have in the past – an outcome with significant implications for stand growth and timber yield. Similarly, there are strong rainfall and temperature effects underpinning the widespread mortality of large old mountain ash and alpine ash trees in the Central Highlands region (Lindenmayer *et al.* 2012); these trees have a large array of important ecological roles in maintaining the integrity of these forest ecosystems (Lindenmayer *et al.* 2015*a*).

In some cases, the combination of past and emerging threats has resulted in the deterioration in the conservation status of particular species within a given RFA region. An example is one of Victoria's faunal emblems – Leadbeater's possum (*Gymnobelideus leadbeateri*). This species is largely confined to the area encompassed by the Central Highlands RFA and was recently uplisted to Critically Endangered by the Australian Government (Australian Government 2015). We note that one of the central tenets of the RFAs is to ensure that a CAR (Comprehensive, Adequate and Representative) reserve system is established to protect biodiversity. Yet, all credible analyses to date indicate that the current reserve system for Leadbeater's possum is not adequate. The parlous state of remaining populations of Leadbeater's possum has occurred as a result of the effects of widespread industrial logging, recurrent wildfire, and interactions of fire and logging. The likely most effective strategy for conserving Leadbeater's possum is to set aside a large ecological reserve (Lindenmayer *et al.* 2015*a*). Population viability analysis (Lumsden *et al.* 2013) and reserve design analyses (Taylor, C., Wintle, B., and Lindenmayer, D. B. unpubl. data) suggest that reserving almost all of the mountain ash and alpine ash forest from logging will be required to secure the persistence of the species. Establishing a large ecological reserve would have a major impact on the timber and pulpwood yields from mountain ash and alpine ash forests within the Central Highlands RFA region. This leads to a stark choice between maintaining ongoing logging regimes, which have significant negative effects on Leadbeater's possum, and which are demonstrably unsustainable, versus conserving a critically endangered species (Lindenmayer *et al.* 2015*a*). RFAs are not structured to deal adequately with this type of issue, yet RFAs override the federal *Environment Protection and Biodiversity Conservation Act 1999*.

The need to adequately deal with existing threats

While it seems clear that RFAs in their current form have limited ability to respond to new and emerging threats in forest ecosystems, it is arguable that they have not adequately dealt with well known existing long-term threats. One of these is the risk of overcutting of native forests that fails to leave sufficient 'environmental margin' for other key values of native forests.

In the case of the Central Highlands RFA, recurrent wildfires have significantly reduced the amount of 'green forest' that can be harvested under normal (80-year) rotation times, particularly after the 2009 Black Saturday wildfires. Fire is a major, well known form of natural disturbance in the forests of the Central Highlands RFA (Smith *et al.* 2014) and even well before the RFA was signed, analyses undertaken for the Victorian Government suggested a need to set conservative levels of sustained yield to accommodate the losses of burned forest for wood production that were invariably going to occur (Burgman *et al.* 1994). This was not done, and we argue that this has led to overcutting at unsustainable rates. Even following the 2009 fires in the Central Highlands RFA region, a reduction in sustained yield did not occur for another six years, meaning that the remaining unburnt 'green' forest was cut at faster proportional rates than otherwise would have occurred. Inflexibility may also have led to decade-long delays in implementing the Variable Retention Harvest System in Victorian ash forests (Lindenmayer *et al.* 2015*b*), which better integrates conservation and production values, and which has been experimentally evaluated in partnership between forest management agencies and university researchers.

It could be argued that some State Governments never intended to appropriately deal with overcutting. Archived correspondence from the former Kennett Government in Victoria shows that senior departmental officials recommended that the Premier not sign the RFA for the Central Highlands of Victoria if it had any negative effects on wood flows to companies for paper manufacturing at the Maryvale Mill – by far the largest mill of its kind in the State (Premier of Victoria 1995). We suggest that the only solution to the problem of over commitment of timber and pulpwood resources is a comprehensive review of sustained yields that accommodates the losses of forest likely to occur through wildfires, as well as changes in productivity that appear to be inherent as a result of rapid climate change (Wood *et al.* 2014).

General discussion

The signing of RFAs was heralded with great fanfare. For example, the RFA for the Central Highlands of Victoria was lauded as a bonus for endangered species conservation and a great outcome for delivering certainty for industry. In a media release on 27 March 1998, the then Federal Environment Minister, Senator Robert Hill, declared, 'The RFA will result in more effective management of endangered species by protecting areas of high quality habitat, by making programs more focussed, and by setting priorities for specific plans to protect threatened species' (Australian Government 1998). Many of these outcomes were not delivered and the optimism in the press release was unwarranted. Indeed, RFAs have overseen perverse outcomes with economic and environmental problems accentuated over the past 20 years. Leadbeater's possum and the swift parrot are now Critically Endangered. The native forest logging industry is uneconomic in some regions (VicForests 2013), with businesses in major decline in others (including Gunns in Tasmania, which went from being the largest woodchip exporter in the Southern Hemisphere to voluntary administration in 2012). These and numerous other problems indicate that RFAs are in urgent need of comprehensive overhaul. Perhaps the need for such an overhaul should have been foreseen, especially given the array of problems in the original RFA documents outlined by many scientists (e.g. Calver *et al.* 1998; Dargavel 1998; Horwitz and Calver 1998; Kirkpatrick 1998; Musselwhite and Herath 2005; Brueckner *et al.* 2006). It is regrettable that little progress appears to have been made in resolving these deficiencies that were identified almost two decades ago.

Comprehensive Regional Assessments preceded signing the initial round of RFAs, although it is debatable as to whether they included all appropriate and available scientific information at that time (Horwitz and Calver 1998). We argue that Comprehensive Regional Assessments must be thoroughly redone to consider the important new insights for forest ecology and forest management that now exist for every one of the regions encompassed by the RFAs. Given that current RFAs are based on information that was current in 1997, we consider that it would be inconceivable that in 2037 such documents would continue to be underpinned by information that is by then 40 years old! To ignore new information and new values would make a mockery of current government mantras of 'evidence-based management and evidence-based policy'. Rather, we suggest that comprehensively overhauled RFAs must: (1) accommodate new scientific information including new knowledge on existing and new threats, such as climate change and invasive species (e.g. the sugar glider in Tasmania); (2) accommodate new values of forests such as their importance for long-term carbon storage; (3) employ proper resource and financial accounting, such as widely accepted SEEA accounting methods; and (4) reduce levels of sustained yield to account for the extent of forest loss associated with disturbances such as wildfires and climate-change-derived impacts on stand growth and productivity.

In conclusion, the period spanning the current Regional Forest Agreements has seen some endangered species uplisted to Critically Endangered, key wood production forest ecosystem types become endangered (see Burns *et al.* 2015), and logging in some entire regions (such as East Gippsland) become uneconomic (VicForests 2013). In some respects, the Regional Forest Agreements must be viewed as being the antithesis of economic and environmental success. We therefore argue that it is incomprehensible that the Regional Forest Agreements could be 'ticked off' for another 20-year term without comprehensive reappraisal.

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