

Citation: Wilkinson, G.R. (2006). Managing private forests for public benefit – the challenge for forest conservation in Australia. *Sustainable Forestry – Everyone Benefits*. Conference papers of the Australian Forest Growers International Biennial Conference, Launceston, 22nd – 25th October 2006, pp. 81-92.

Managing private forests for public benefit - the challenge for forest conservation in Australia

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Abstract

The Australian community has traditionally sought to achieve its forest conservation goals through the management of public forests and it has been reluctant to interfere with the rights of private forest owners. In recent years, it has become increasingly evident that forest conservation goals can no longer be achieved from the public estate alone. As a result, governments have imposed increased restrictions and reservation requirements on private forests. It is likely that private forests will make an increasing contribution to the conservation of forest values; the challenge will be to achieve an equitable sharing of costs and benefits. An over-reliance on reservation and restrictions will impose unreasonable burdens on individual forest owners and on the community as a whole. Fair and effective regulation of forest use delivers a balance of public and private benefits, which can offset the cost of conservation management.

Changes in forest use

Australia covers an area of 768 million hectares, of which 33% (253 million hectares) is estimated to have been covered in forest and woodland prior to European settlement in 1788 (National Forest Inventory 2003).

For the first hundred years of European history in Australia, forests were largely viewed as something to be cleared to make way for settlement and agricultural development. Concern about the loss of forest in the 1870s led to the setting aside of public lands for the preservation and growth of timber. The dedication of Crown land as State forest for the permanent production of timber was accompanied by varying degrees of opposition from the agricultural sector. By 1916, only 4.4 million hectares of forest had been dedicated for forestry use. Smaller areas of forest were also reserved for “the delight and recreation of the populace” (Dargavel 1995). However, governments were still actively promoting the alienation of land and the clearing of forest for agriculture. For example, in Tasmania, purchasers of Crown land were required to complete ‘improvements’ such as fencing and ring-barking before being granted legal title to the land (*Crown Lands Act* 1911).

The dedication of land as State forest accelerated during the mid 20th century, reaching a peak of about 13 million hectares in 1978. The area of forest reserved for conservation purposes increased from about 2 million hectares in 1970 to over 21 million hectares in 2003 (National Forest Inventory 2003).

From the 1970s, forest management was increasingly focussed on achieving a balance between wood production and the conservation of biological and cultural values. In 1992, the National Forest Policy Statement (Commonwealth of Australia 1992) identified four principles for forest conservation in Australia:

1. the maintenance of an extensive and permanent native forest estate and the management of that estate in an ecologically sustainable manner;
2. the establishment of a reserve system, based on the principles of comprehensiveness, adequacy and representativeness (CAR);
3. complementary management of public forests outside reserves by way of codes of practice;
4. promoting the management of private forests in sympathy with nature conservation goals.

This paper discusses how these principles have been implemented, with particular reference to the role of private forests within Tasmania.

The current extent of the native forest estate

Australia's current native forest estate of 163 million hectares represents 64% of the estimated original forest cover. Tasmania, with 3.2 million hectares of native forest, has retained about 59% of its original forest cover (Tasmanian Public Land Use Commission 1996). Table 1 shows current forest cover by tenure.

Table 1. Tenure of native forests in Australia and Tasmania as a percentage of forest area in 2001 (National Forest Inventory 2003)

| Tenure | Australia | Tasmania |
|----------------------------|------------------|-----------------|
| Private | 24% | 29% |
| Leasehold | 46% | 0 |
| Conservation reserve | 13% | 35% |
| Public multiple-use forest | 7% | 33% |
| Other public forest | 9% | 3% |

Most Australian States and Territories now have legislation and policies in place to phase out the broad-scale clearing of forest. In Tasmania, a policy for the maintenance of a permanent forest estate was first developed in 1997. At that time, the policy prescribed the retention of at least 80% of the extant native forest area as mapped in 1996. A review of the policy in 2005 resulted in the retention level being lifted to 95% of the 1996 forest area. The conversion of rare, vulnerable or endangered forest types is not permitted and the broad-scale clearing of other forest types must end by 2015. A restriction on clearing is seen by some landowners as *de facto* reservation. However, the policy does not preclude land uses that will maintain the forest type at the site. Such land uses could include logging and regeneration; or grazing by stock.

The reservation of forests

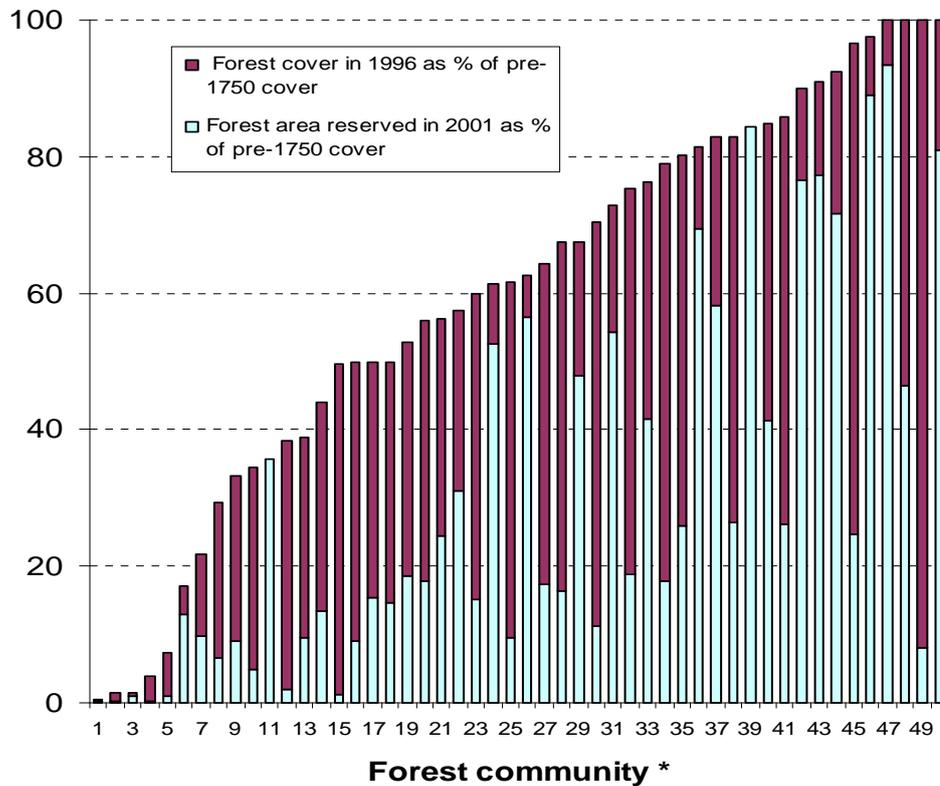
The total area of formal and informal forest reserves across all tenures comprised 14% of Australia's forest area in 2001 (i.e. approximately 9% of the estimated original forest cover) (National Forest Inventory 2003). In 2005, 45% of Tasmania's forest area was included within formal or informal reserves, representing about 27% of the original forest cover (Supplementary Regional Forest Agreement 2005). However, measuring forest conservation only in terms of area in reserves ignores the substantial contribution that off-reserve management makes to maintaining biodiversity and other non-wood values.

Forest communities as surrogates for biodiversity

The reservation of forests cannot systematically target and capture all biodiversity at a species level. Consequently, forest ecosystems are generally classified into communities that are used as broad surrogates for ecological diversity. Regional Forest Agreements between the Federal and State Governments have adopted the JANIS criteria for the establishment of a comprehensive, adequate and representative (CAR) reserve system based on the reservation of at least 15% of the estimated original cover for each forest community or targets of 60% or 100% of extant cover for threatened forest communities (Commonwealth of Australia and State of Tasmania 1997).

Progress towards a CAR reserve system in Tasmania is detailed in Figure 1 (data from Tasmanian Public Land Use Commission 1996, Forest Practices Board 2002). Prior to the RFA in 1997, five of the 50 forest communities (10%) already had extant areas below 15% of their pre-1750 cover and only 21 communities (42%) met the 15% target for reservation. By 2001, 31 communities (62%) had met the target, leaving 14 communities (28%) where the reservation target was not reached but was still theoretically achievable.

Figure 1 – Forest area in 1996 and area reserved in 2001 as a proportion of estimated original (pre-1750) cover for the 50 forest communities within Tasmania (* for a list of forest communities see Appendix 1)



Ecological processes

The management of biodiversity must take account of the mosaic of natural and imposed disturbance and successional regimes across tenure boundaries. However, information about the current mix of growth stages of forests is known for only 8% of Australia’s forest, having been determined for 41% of multiple-use public forest and 24% of forests in nature conservation reserves (National Forest Inventory 2003).

The information on growth stages is most complete for the forests of Tasmania. Old growth (defined as ecologically mature forest where the effects of any disturbance are now negligible) accounts for about 77% of the forest in Tasmania’s conservation reserves, compared to less than 13% of the private forest estate (Forest Practices Board 2002). The differences are explained by the remoteness of much of Tasmania’s

reserves and the history of imposed disturbance (e.g. logging, grazing and fire) in private forests and woodlands.

These data emphasise not only the importance of reserves for retaining adequate areas of undisturbed ecologically mature forest, but also the importance of non-reserve forests for maintaining adequate areas of early successional (regrowth) forest. Brown (1996) recognises the range of disturbance regimes that are applied across the forest estate, from the intensive silvicultural systems applied to some wood production forests, to the typical form of management within conservation reserves that he refers to as 'benign neglect'. The exclusion of some critical disturbance regimes e.g. burning, from some reserves will eventually lead to the replacement of fire-dependent forest types (such as the wet eucalypt forests) with fire-sensitive forest types (such as *Nothofagus* forest) (Gilbert 1959), thus changing the ecological diversity within reserves. In contrast, intensive forest management can substantially modify normal successional pathways within forests outside of reserves. For example, clearfelling rotations of 80 to 120 years are too short to allow the re-colonisation of species that rely upon late successional features such as hollows, large dimension groundwood and moist, shady micro-sites (Hickey 1994, Lindenmayer and Franklin 1997). Brown (1996) postulates that the current spatial array of different disturbance regimes across tenures may provide a dynamic balance for biodiversity values in time and space, or alternatively it may provide an imbalance, leading to some form of ecological collapse.

Reserve management

The proportion of forest in reserves is a function of political decisions that are informed by a combination of science, economics and social attitudes. However, the establishment of reserves does not guarantee that their associated biodiversity will be effectively protected. In developing nations, resources are often not adequate to control direct threats to biodiversity, such as poaching and illegal logging (ITTO 2006). Even in many developed nations, reserve managers often do not have sufficient funds or community support for management activities relating to the control of forest fuels, weeds and pests, leading to both catastrophic and more gradual forms of habitat degradation.

The proportion of reserved forests in Australia has increased ten-fold over the last 30 years. However, the rapid expansion in reserves has not been accompanied by commensurate increases in funding and resources. Funding for the management of conservation reserves varies from \$28.14 per hectare in NSW to \$8.53 per hectare in Tasmania, but the additional funding for 450,000 hectares of new reserves in Tasmania over the period from 1999 to 2006 equates to only \$2.00 per hectare of new reserve (A. Roberts, Tasmanian National Parks and Wildlife Service, pers. comm. 29/6/06). Bushfires represent one of the greatest threats to the maintenance of biodiversity within reserves, yet community complacency and inadequate resources are recurrent findings from all 14 inquiries into significant bushfire events in Australia since 1939 (Kanowski *et al* 2005). The management of reserves is especially problematic where the reserves are small and fragmented, and where boundaries are difficult to protect from weed invasion, fires and activities such as the removal of forest products, hunting, vandalism, rubbish dumping and off-road vehicular use. These issues highlight the importance of ongoing guardianship and management of reserves, whether carried out directly by public bodies or indirectly through incentives to private land owners.

Implications for private land

In most jurisdictions, a comprehensive, adequate and representative reserve system can not be established wholly from the public estate. In Tasmania the targets set in 1996 required the reservation of approximately 115,000 ha of privately-owned forest from 24 of the 50 forest communities distributed within the State (Private Forests Reserves Program 1998). The Tasmanian Regional Forest Agreement in 1997 established a joint Federal-State Government program to seek the reservation of this area on a voluntary basis from private forest owners. When the program ended in June 2006, approximately 43,000 ha had been secured by purchase (16%), covenant (82%) or management agreement (2%) (Private Forests Reserves Program 2006). The modest success of the program highlights two important issues-

1. Many landowners are reluctant to commit their land to a restrictive form of land use in perpetuity because of the loss of existing use rights (such as grazing and timber harvesting) and because of concerns (of landowners

and mortgagors) about the potential devaluation of the property's commercial value.

2. Governments are reluctant to bear the expense and difficulty associated with the ongoing management of relatively small and fragmented reserves.

The reservation of private land under conservation covenants and agreements is still very much an evolving concept. The experience of the Private Forests Reserves Program indicates the need for a range of flexible and pragmatic options for landowners. The highest level of protection (IUCN Category I - Strict Nature Reserve) incurs continuing management costs for either the landowner or government (or both). In contrast, the management of the land as a Managed Resource Protected Area (IUCN Category VI) allows the cost of conservation measures to be offset through the continuation of other uses of the land on a sustainable basis. It is also evident that many landowners do not want to make permanent or long-term commitments, preferring medium-term (10-25 year) agreements that allow them the opportunity to re-negotiate future options. These trends are recognised in a new voluntary program established in 2005 under the Tasmanian Community Forest Agreement. This program aims to secure a further 45,600 ha of under-reserved forest on private land through a range of perpetual and fixed-term agreements that can be tailored to each landowner's property management goals (Commonwealth of Australia 2006).

Off-reserve management on public and private land

Forests are managed according to administrative boundaries, which do not always follow ecological boundaries and usually impose substantially different management goals and actions on either side of the boundary (Landres *et al* 1998).

Despite recent increases in Australia's reserve system, 87% of the forests and a large proportion of the biodiversity remains in areas managed outside of reserves. For this reason the National Forest Policy Statement recognises the importance of complementary management across the mosaic of land tenures. The Policy requires the application of codes of practice to forests outside reserves on public land, but not on private land, reflecting the traditional reluctance of governments to restrict private rights through mandatory controls. Instead, the Policy seeks to foster good

stewardship of private forests through incentives based mainly on advisory and assistance programs. This approach maintains the pattern of different standards for biodiversity management across the mosaic of different tenures. However, these differences are gradually becoming less pronounced. In 1999 all States had codes of practice for public multiple-use forest but only two States (Tasmania and Victoria) had codes that applied to private land (Wilkinson 1999). By 2003, six States had codes for private land although only three were compulsory (National Forest Inventory 2003).

Codes of Practice and associated planning tools provide prescriptions for the application of appropriate silvicultural practices, such as the retention of uncut patches or strips of forest, and the maintenance of some key habitat attributes such as large old trees, understorey plants and coarse woody debris within logging areas. Management prescriptions and processes inevitably increase over time in response to improved knowledge and increased regulatory requirements. In Tasmania, the management tools that support the Forest Practices Code increased 50-fold in the 15 years following the introduction of the Code (Figure 2, data derived from Forest Practices Board 1993, 2000). The challenge for governments is to ensure that regulatory processes are as practical and efficient as possible, whilst meeting increasing expectations for credibility, transparency and accountability.

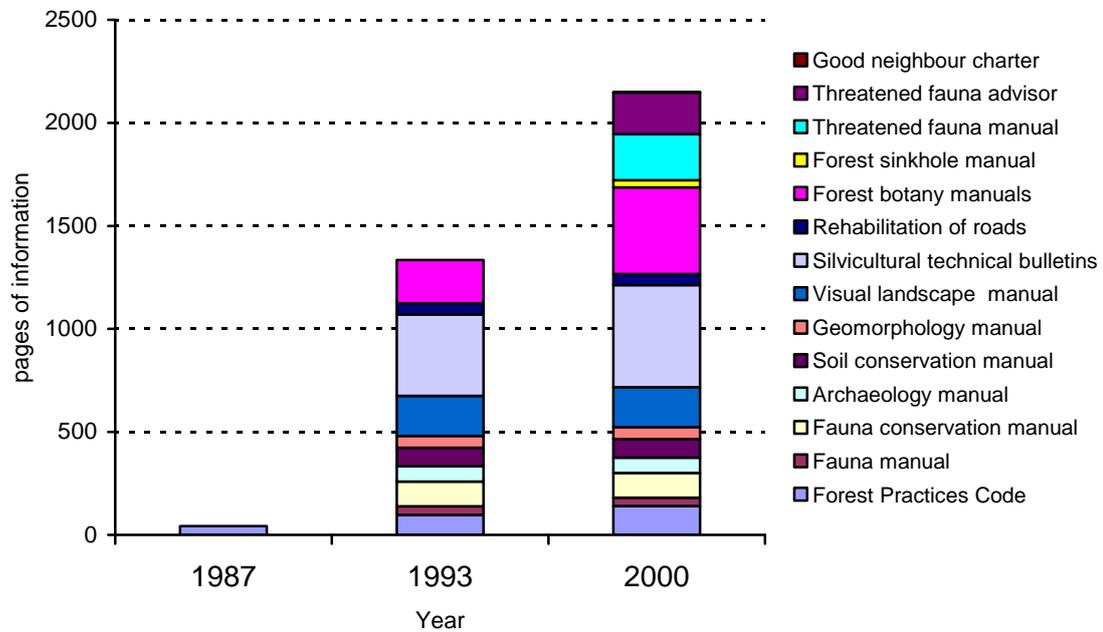
Private landowners are unlikely to invest in the long term management of their forests unless they have confidence that they can derive future benefits. This means legislated security of the right to practice sustainable forest management, together with an efficient regulatory framework and equitable arrangements for sharing the public and private benefits that flow from sustainable forest management. These requirements are addressed under Tasmanian legislation as follows:

1. **Legal/policy framework** - The legislative basis for the regulation of private forests is the *Forest Practices Act 1985*, which has a statutory objective of achieving sustainable forest management. That is, the primary Act is one that seeks to “prescribe the manner in which forest practices shall be conducted so as to provide reasonable protection to the environment” (s.31(1) of the *Forest Practices Act*). This is a subtle but important feature that separates the Act from others that have environmental protection and conservation as their primary objective. As far as possible, the *Forest Practices Act* is delivered

though an integrated planning process administered by one statutory body, the Forest Practices Authority. This approach contrasts with other national and international jurisdictions where forest management is regulated by multiple agencies under a plethora of legislation, resulting in excessive bureaucracy and/or conflicting objectives (Wilkinson 1999).

2. **Private Timber Reserves** - The *Forest Practices Act* provides a secure land use planning system for private forests through provisions that enable landowners to have their land declared as a Private Timber Reserve. Private Timber Reserves are regulated under a single State-wide forest practices system. Forestry activities within the reserves are not subject to the vagaries of local planning schemes that are administered by 29 different Councils on behalf of a State-wide population of only 480,000.
3. **Forest Practices Officers** - The forest practices system fosters responsible self-regulation and streamlined approval processes through the accreditation of Forest Practices Officers who are employed by forest managers and given powers to prepare and certify plans, monitor operations and take enforcement action. Independent auditing and enforcement is undertaken by the Forest Practices Authority.
4. **Forest Practices Code** - The Forest Practices Code provides practical guidelines that can be adapted to individual forests in a pragmatic and effective manner. Importantly, the Code prescribes a duty of care by private landowners, which is defined as the fundamental contribution of the landowner to the conservation of natural and cultural values. The duty of care provides that a landowner must take whatever measures are necessary to protect soil and water values. In addition, the landowner must protect other values such as biodiversity up to a maximum of 10% of the forest area. Beyond this level, the protection of values is deemed to be for the public benefit and should be achieved through voluntary or compensation arrangements (Forest Practices Board 2000). Compensation provisions apply if forest practices plans are refused or amended to protect threatened species and threatened vegetation communities.

Figure 2: Increase in planning tools related to the Tasmanian Forest Practices Code since 1987



Although management prescriptions and regulation are usually applied by governments in relation to development activities such as forest harvesting and land clearing, it is important to recognise that many other activities that affect conservation values are not directly regulated. For example, up to 80% of Australia’s forests are potentially available for grazing. Appropriate levels of grazing can help to maintain ecological diversity, for example by preventing the over-dominance of tussock grasses that can inhibit inter-tussock species (Kirkpatrick 1999). However, grazing practices can also lead to the replacement of natural understorey vegetation and regrowth with a simplified range of native or introduced grasses and weeds. Inappropriate or excessive grazing, burning and tree removals can cause or exacerbate forest dieback, which can exceed a loss of 1% of crown cover per year in some drier woodlands (Kile *et al.* 1980). Other significant threats to biodiversity are posed by feral animals, weeds, salinity, soil erosion or compaction, loss of riparian protection etc. Mitigation of these threats requires long term changes in management practices within vulnerable areas. Such changes are best brought about by programs that are based on education and incentives to encourage improved management practices.

Implications for private land

The application of management prescriptions to private land incurs costs and benefits that are not distributed equally (Dixon and Sherman 1990). Costs are often borne by landowners rather than the community that derives the 'public good' benefits. The Productivity Commission (2004) concluded that biodiversity regulations in Australia have a major impact on private landowners by constraining agricultural development and inhibiting on-farm efficiency gains associated with new technologies such as pivot irrigation. Another concern was the risk of perverse outcomes for nature conservation, where the additional costs imposed by regulations cause a reduction in farm profitability, resulting in a reduced capacity to undertake conservation works such as weed and pest control.

The imposition of restrictions can unleash strong opposition and resentment among landholders and elements of the community, particularly if the restrictions apply to rights that were previously unfettered (Kehoe 2006). As a result, private landowners have strongly argued for compensation to be paid where restrictions are imposed in the public interest. However, there is much debate about what 'compensation' actually means. To some, compensation may encompass one or a combination of the following:

1. payment of a 'commodity value' for maintenance and protection of a particular species or ecosystem;
2. payment for management services to conserve biodiversity, such as fencing and weed control;
3. payment for existing rights foregone as a result of restrictions imposed to protect biodiversity, such as the cessation of timber harvesting or grazing practices;
4. payment for opportunity foregone as a result of restrictions, such as a refusal of development proposals for a change in land use.

The debate over compensation is not helped by the lack of clarity under Anglo-Australian law as to the extent to which property rights include ownership over biological diversity (Sheehan and Small 2005). Private land owners have traditionally assumed that they have ownership over the natural vegetation occurring on their land, and this is commonly accepted at law with respect to timber and grasslands. However

Sheehan and Small (2005) argue that private rights are constrained. The mobility of fauna poses problems for any claim of exclusive possession. Furthermore, governments reserve the right to control the treatment of flora and fauna. In Tasmania, most fauna species are fully or partly protected under the *Nature Conservation Act 2002*, which restricts the right of landowners to take or destroy wildlife or the products of wildlife.

The payment of a 'commodity value' for a species or ecosystem is also problematic. Many species and forests have traditionally had no intrinsic commercial value, but may now have very high conservation value. However, governments are reluctant to place a direct financial value on biodiversity. How much is an endangered eagle or beetle worth?

Payments for management services to conserve biodiversity are, however, well accepted and entrenched through traditional programs for assistance with fencing, weed control and rehabilitation. Usually the payments take the form of payments for specific activities. In recent years, this concept has been extended to cover a more integrated approach to property-based planning through vegetation management agreements and covenants.

There is no general entitlement to compensation for the removal of existing rights to undertake activities such as the harvesting or clearing of forest. However, legislatures may provide specific entitlements where the impact of restrictions for the public good is seen to be unfairly borne by individuals. The Tasmanian *Forest Practices Act* provides for the payment of compensation in certain situations where a harvest right is refused. In such cases the compensation entitlement is determined solely on the basis of the timber values forgone. Payments to landowners are only made where the Minister determines that the conservation gains outweigh the cost of compensation, otherwise the Minister can refuse to pay compensation but in doing so must remove the restriction on timber harvest.

Compensation for the loss of development opportunities is not a generally accepted principle at law. Hence there are no general entitlements where a landowner is denied the right to subdivide land for residential development or to convert a native forest to agriculture or plantation. However, Tasmanian legislation provides a specific entitlement in situations where a forest practices plan to conduct harvesting or

clearing of forest is refused because of a requirement to protect threatened species. In such situations the determination of compensation must take account of a number of factors, including both the current and potential value of timber growing or agricultural activities upon the land. As with the provisions of the *Forest Practices Act* above, the Minister can refuse to pay compensation but must then remove any restriction relating to the protection of the threatened species.

Discussion and Conclusions

The history of forest use in Australia reflects changes in community attitudes, from the pioneering era in which governments encouraged the clearing of forests for settlement, through phases of setting aside forests for wood production and conservation. Since the beginning of the ‘modern conservation era’ in the 1970s, community support for forest harvesting and clearing on private land has progressively declined. The substantial changes in community attitudes and governmental regulation have occurred within the lifespan of the current generation of private landowners and it is therefore understandable that the private sector has serious concerns about future public expectations regarding the management of private forests.

It is clear that the community’s expectations with respect to the conservation of forest values cannot be met solely from the public estate. If the shortfall is to be met from the private estate, the community must be prepared to pay for the costs of managing the land. In most situations, in both public and private tenure, it is not an option to simply ‘lock-up’ land by either reservation or regulation without ongoing stewardship and management to protect its conservation values.

Developing nations clearly understand that their forests need to produce economic and social benefits for their communities; otherwise the forests will be degraded or converted to other forms of land use (ITTO 2006). More affluent countries such as Australia have demonstrated that they are prepared to forgo much of the economic benefit from their public forests but there is little evidence that the public is prepared to accept the full cost of managing private forests for social and environmental outcomes. This is understandable, given that 87% of Australia’s forests exist outside of reserves, with 70% under private management. It is not a sensible option to over-burden the public sector with responsibility for the management of conservation

values by way of reservation. Similarly, it is not a sensible option to restrict the use of private forests to the point where landowners derive insufficient benefit to cover the cost of protecting conservation values.

Many of the costs associated with the conservation of forest values on private land arise because of the narrow perception that forests can only be protected by reserving them or by prohibiting any resource use. This view seriously endangers the substantial conservation gains that can be achieved through the sustainable management of forest resources and it also runs counter to the dynamic ecological nature of forest ecosystems, including the reliance on some forms of environmental disturbance in order to sustain regeneration.

Forests need to be actively managed to produce the balance of economic, social and environmental benefits sought by forest owners and the broader community.

Reserves are a fundamental component of the landscape mosaic within Australia, but they do not adequately capture all forest types or successional stages. Ecological and structural diversity across the broader landscape is enhanced where there is a mixture of appropriate management regimes (including timber harvesting, burning and grazing), which maintain a balance of age class structures, healthy regeneration and successional processes. Private forests can be managed to produce substantial private and public benefits. However, for this to be fully achieved the public needs to recognise that:

1. the sustainable management of natural resources can increase the capacity of forest owners to offset the cost of protecting important conservation values;
2. pragmatic, practical and efficient systems of regulation are needed to deliver management prescriptions, including a defined duty of care by forest owners;
3. mechanisms must be available for protecting values beyond the duty of care for the public benefit, through appropriate incentives and payments by the public.

Acknowledgements

I am indebted to Fred Duncan and Greg Unwin for their incisive comments on a draft of this manuscript.

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Appendix 1 – Forest types in Tasmania (from Tasmanian Public Land Use Commission 1996)

- 1 Furneaux *E. viminalis* forest
- 2 King Island *E. globulus* / *E. brookeriana* / *E. viminalis* forest
- 3 *Melaleuca ericifolia* forest
- 4 Shrubby *E. ovata* / *E. viminalis* forest
- 5 Wet *E. viminalis* forest on basalt
- 6 *E. viminalis* and/or *E. globulus* coastal shrubby forest
- 7 *Allocasuarina verticillata* forest
- 8 *E. brookeriana* wet forest
- 9 Inland *E. amygdalina* forest
- 10 Inland *E. tenuiramis* forest
- 11 Pencil Pine forest
- 12 *E. rodwayi* forest
- 13 Furneaux *E. nidtida* forest
- 14 *E. pauciflora* forest on sediments
- 15 *E. viminalis* grassy forest/woodland
- 16 *E. amygdalina* forest on sandstone
- 17 *E. viminalis* / *E. ovata* / *E. amygdalina* / *E. obliqua* damp sclerophyll forest
- 18 *Acacia melanoxylon* forest on rises
- 19 Coastal *E. amygdalina* dry sclerophyll forest
- 20 Dry *E. obliqua* forest
- 21 Grassy *E. globulus* forest
- 22 *Leptospermum* species / *melaleuca squarrosa* swamp forest
- 23 *Acacia melanoxylon* forest on flats
- 24 Dry *E. nidtida* forest
- 25 *E. amygdalina* forest on dolerite
- 26 Tall *E. nitida* forest
- 27 Tall *E. obliqua* forest
- 28 *E. pulchella* / *E. globulus* / *E. viminalis* grassy shrubby dry sclerophyll forest
- 29 *Notelaea ligustrina* / *Pomaderris apetala* forest
- 30 *E. pauciflora* forest on Jurassic dolerite
- 31 Thamnic rainforest on less fertile sites
- 32 *E. sieberia* forest on other substrates
- 33 Callidendrous and thamnic rainforest on fertile sites
- 34 *E. regnans* forest
- 35 Tall *E. delegatensis* forest
- 36 Huon Pine forest
- 37 *E. tenuiramis* forest on dolerite
- 38 Dry *E. delegatensis* forest
- 39 Pencil pine with deciduous beech forest
- 40 *Callitris rhomboidea* forest
- 41 *E. sieberi* forest on granite
- 42 King Billy Pine forest
- 43 *E. subcrenulata* forest
- 44 *E. coccifera* dry forest
- 45 Silver wattle (*Acacia dealbata*) forest
- 46 King Billy Pine with deciduous beech forest
- 47 *E. tenuiramis* forest on granite
- 48 *E. risdonii* forest
- 49 *E. morrisbyi*
- 50 *Banksia serrata* woodland