6 Planning Private Native Forest Use in Australia

Ray D. Spencer, Michael F. Ryan, Philip K. Tickle and Claire I. Howell
Bureau of Rural Sciences, PO Box E11, Kingston, ACT 2604, Australia

Introduction

Australia's land area is approximately equivalent to the area of the contiguous USA, but whereas US forests cover some 295 million ha, a third of the land area (Powell *et al.*, 1993), Australia's forests[1] only cover 157 million ha (including plantations), representing 20% of its land (National Forest Inventory, 1998). This includes 112 million ha of woodland; timber-producing forests make up only a small proportion of the total forest area. Almost 73% of Australia's forests are in public ownership, but 70% are managed by the private sector, including freehold land and public land leased to private interests, primarily for cattle grazing. The remaining 30% is on public land managed by state and territory agencies.

Under Australia's federal system of government, powers relating to land-use and natural resource management reside primarily with the governments of six states and two territories. National jurisdiction on these matters, vested in the Commonwealth of Australia, relates mainly to international treaties, international trade, and achieving consistency between different states and territories (Commonwealth of Australia, 1997). The Commonwealth Government can exert considerable influence in some policy areas, such as through its export licensing powers that control a large international trade in wood chips. However the states and territories are responsible for strategic and tactical planning for managing their public forests and overseeing requirements for private forests (Chikumbo *et al.*, 2001).

In 1992 the Commonwealth, state and territory governments reached agreement on a National Forest Policy Statement (Commonwealth of Australia, 1992), which provides strategic directions for achieving sustainable management of publicly owned forests and a framework for coordinating planning and management of all forests.

As in the USA, Australia's forests have been the subject of intense debate covering wide-ranging issues, but particularly old-growth, clear felling and wood chip exports. This debate reached fever pitch in 1995, culminating in a blockade of the federal parliament by logging personnel and trucks from around Australia. Their protest was against Commonwealth delays in renewing wood chip export licences that were threatening their livelihoods and the survival of many dependent rural communities. The delays were due to community concerns and environmental group lobbying about the wood chip industry.

The Government's dilemma was how to appease the loggers and a broad constituency of vocal conservationists who were seeking to seriously change or curtail harvesting activities in native forests. The immediate impasse was resolved when the Commonwealth agreed to renew export licenses on condition that all parties – representing state, industry and conservation interests – entered into a Commonwealth/State government process – the Regional Forest Agreement (RFA) process –

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to be established under the National Forest Policy Statement.

Commenced in 1995 and completed in 2001, the Regional Forest Agreement programme covered 45 million ha in 12 regions in five states (Fig. 6.1). While these regions only represent approximately 6% of the total forest area, they include a substantial portion of Australia's commercial forests (Commonwealth of Australia, 1997). At the start of the programme approximately 17.6 million ha of the publicly owned forests were in formal conservation reserves and an additional 13.4 million ha were being managed for multiple uses, including timber production (National Forest Inventory, 1998). On completion of the programme in 2001 the area in conservation reserves had been increased to 20.4 million ha and multiple-use forests reduced to 11.9 million ha. Subject to these being managed in accordance with ecologically sustainable principles, the multiple-use forests were committed to provide a sustainable flow of timber to industry for the next 20 years, at which time each Agreement would be reviewed. Although rezoning of forest uses only occurred on public forests being managed by public authorities, there were serious repercussions for private forest management.

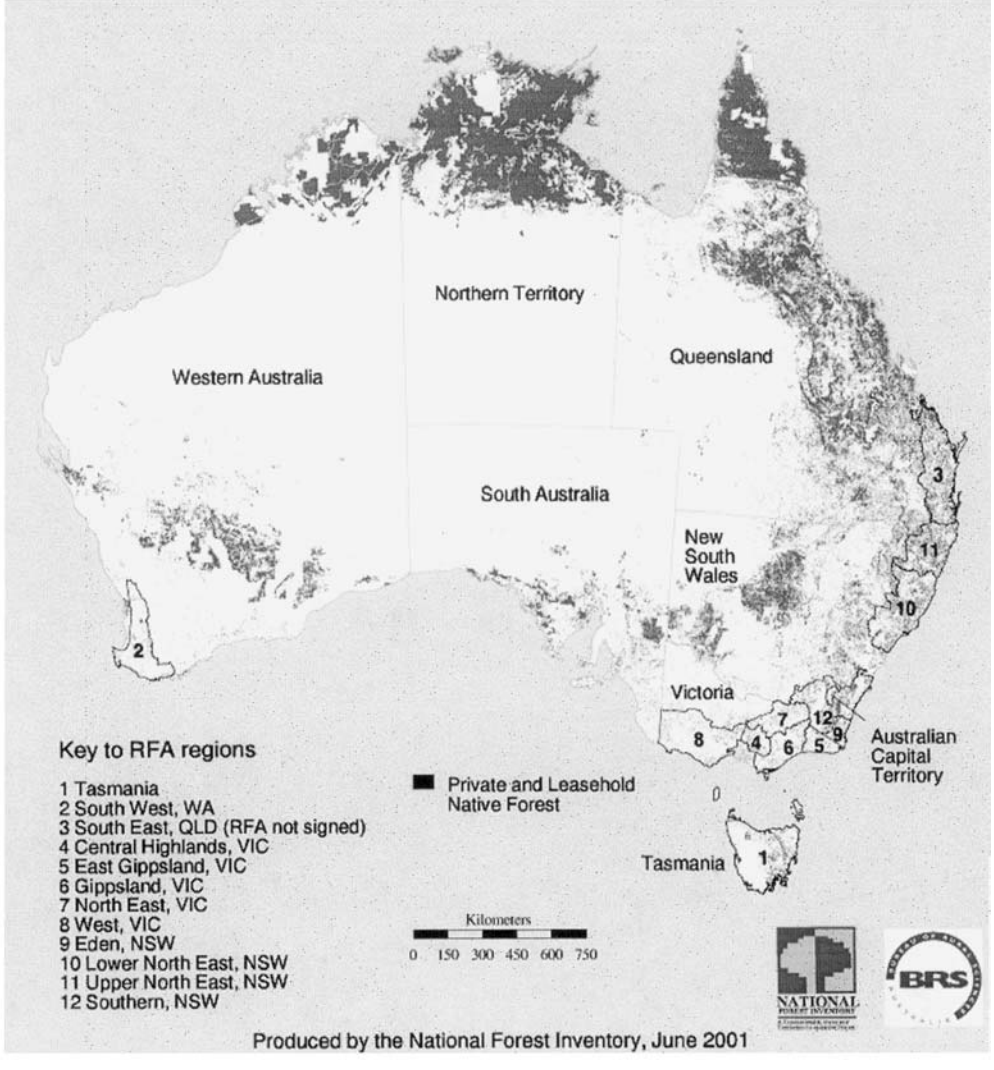

Fig. 6.1. Regional Forest Agreement regions and distribution of private native forests.

The Regional Forest Agreement programme had three major aims:

- the development of a first class 'comprehensive, adequate and representative' (CAR) conservation reserve system for Australia's forests to maintain regional environmental, heritage and social values;
- to lay the foundations for ecologically sustainable management of multiple use forests; and
- to secure access to timber resources for sustainable, internationally competitive forest industries over the ensuing 20 years and beyond, subject to satisfactory reviews.

The comprehensive regional assessments to underpin these agreements considered environmental, economic and social issues, including international conventions for protecting biodiversity and endangered species. A rigorous process was implemented to define a scientifically based set of criteria for establishing a national system of conservation reserves (Commonwealth of Australia, 1997). Various analytical tools were developed to assist this planning process, including the design of conservation reserves to meet specified conservation criteria and industry's requirements for sustainable timber supplies from designated multiple-use forests. This required complex analyses and negotiations, involving flexibility to allow for regional variations in data, analytical requirements and expertise, modelling and system constraints, stakeholder involvement and political context (Bugg *et al.*, 2002). Both the National Forest Policy Statement and Regional Forest Agreement programme address issues that have the potential to impact on private forests. However the overwhelming area of private forests and particular issues relating to their use and management have received only scant attention.

Purpose

This chapter outlines the characteristics and significance of Australia's private native forests and discusses policy initiatives and processes that can contribute to improved understanding of their values and potential contributions to national and regional conservation and industry goals. It focuses on:

- the size, distribution, use and management of Australia's private native forests;
- the planning processes used to resolve forest-use conflicts in key production regions; and
- recent policy initiatives to address data and planning deficiencies for private native forests.

Australia's Private Native Forests

Resources and use

Australia has 156 million ha of native forest (Table 6.1) representing 20% of the continent. Approximately 71% of these forests are woodland (20–50% crown cover); 25% are open wet and dry sclerophyll forest (51–80% crown cover); and 3% are closed forest (81–100% crown cover) consisting of 80% rainforest and 20% mangroves. While ownership is 73% public and 27% private, about 42% of the public native forest is leased by the private sector, mainly for pastoral use. Consequently almost 70% of all forested land is managed by the private sector. This compares with approximately 9% under public multiple-use forest management. Extensive areas of the private native forests have no commercial timber value.

The majority of commercial native forests under private ownership are in the states of Queensland, New South Wales, and Tasmania, with smaller areas in Victoria and Western Australia. There are negligible areas of private native forest with commercial timber value in South Australia and the Northern Territory. Across the RFA regions, approximately 25% of sawlogs are sourced from private freehold forest, while in some regions such as northern New South Wales and south-east Queensland, the production from private forests exceeds that from multiple-use public forests. In 1997/98, 455 sawmills relied entirely on the private forests for their timber resource; a further 397 sawmills sourced timber from both public and private forests (ABARE, 2000). An annual average of 3.9 million m^3 per year of sawlogs and 6 million m^3 per year of pulpwood were removed from Australia's native forests in the period 1994/95–1999/2000. Of this, 720,000 m^3 per year of sawlogs and 2 million m^3 of pulpwood came from private forests (Ryan *et al.*, 2002).

Table 6.1. Forest types and areas by tenure ('000 ha). Source: Australia's National Forest Inventory, 1998.

Forest type	Private	Leasehold	Public and other tenures	% Private and leasehold	Total area ('000 ha)
Eucalypt	33,178	50,681	40,604	67.4	124,463
Tall	1,372	583	4,588	29.9	6,543
Medium	28,640	35,121	27,689	69.7	91,450
Low	988	12,056	1,656	88.7	14,700
Mallee	2,174	2,920	6,670	43.3	11,764
Unknown	5	<1	<1		6
Acacia	2,784	8,525	989	92.0	12,298
Melaleuca	949	2,560	584	85.7	4,093
Rainforest	1,017	414	2,152	39.9	3,583
Casuarina	81	919	52	95.1	1,052
Mangrove	422	118	505	51.7	1,045
Callitris	197	300	370	57.3	867
Other	3,390	2,586	2,459	70.8	8,435
Totals	42,018	66,103	47,714	69.4	155,835

Private native forests in the Regional Forest Agreement regions are also important for their conservation values; 45% of the native forest ecosystems occurring on private land have been identified as priorities for conservation. However the private forests in these regions only represent a small proportion of the national total.

Forest management

Management of Australia's private native forests is mainly subject to state and local government controls, with Commonwealth jurisdiction limited to export licensing and obligations under various international conventions, such as those protecting endangered species and biological diversity.

Each state has its own legislative requirements and facilitation arrangements for managing private native forest, ranging from a relatively non-interventionist approach in Queensland through to substantial agency involvement in Tasmania, Victoria and New South Wales. Additional complications arise with the level of approvals required for private native forest management compared with other agricultural activities, in addition to the substantial public-good values that private landowners are expected to consider in the management of their land.

Complicating factors are the number of private native forest owners and the respective variety of management intent, the varying range of forest management expertise, and the fragmented area and condition of these forests. In addition to the public forest/land management agency involvement in private forests, Regional Plantation Committees have been established through the Commonwealth Department of Agriculture, Fisheries and Forestry to facilitate plantation establishment and advise on private native forest management. They provide an important mechanism for facilitating private native forest networks for information dissemination and communication. Through the Natural Heritage Trust, the Commonwealth government has also provided support for a wide range of local, regional and national initiatives contributing to the management and understanding of the private native forest resource.

The Planning Dilemma

Forest use and management are major political issues in Australia at all levels of government. However, relevant powers are primarily vested in the states and territories, which are fiercely independent. This provides significant challenges to policy making and coordination, as it is first necessary to get agreement on priority issues and then to define mechanisms to address them. The National Forest Policy Statement provided a foundation for the Regional Forest Agreement programme covering the major timber-producing regions in Australia. However the programme

only covered a small part of the national forest estate and focused on publicly managed forests.

Policy for the Regional Forest Agreement programme was to evaluate all forests, public and private, to assess ecological, economic and social values and to reach balanced decisions about future forest use. When a need to protect more vegetation communities in permanent reserves was identified, it was usually achieved by expanding the area of public land reserves. Measures to ensure higher levels of protection of private forests were only implemented in exceptional circumstances because of the limited availability of relevant Commonwealth and state powers and the political sensitivities relating to controls over private resources.

Although the ecological values of private forests were assessed in all of the Regional Forest Agreement regions, their economic resources (particularly timber) were only partially assessed. This is in spite of the fact that private timber represents a significant component of the industrial resource in some regions (e.g. about two-thirds in south-east Queensland).

The conservation and industry policy implications of these approaches are considerable. First, if the area of public conservation reserves is increased, the allocation of land for competing uses (e.g. timber production) must decrease. This affects the level of sustainable yield for industry when alternative resources are not available. Current alternatives are timber from private native forests or, in the longer term, plantations, if the processing plants and timing can accommodate it (the exception). If additional supplies come from private forests, this increases pressures on a resource for which the level of information and management expertise are generally low. Consequently there is an urgent need to improve our understanding of private forests as a first step towards implementing sustainable management.

Planning Model for Key Production Forest Regions

The recently completed Regional Forest Agreement programme covering major commercial forest resources highlighted the conservation and resource importance of private native forests and identified gaps in understanding regarding their condition and management. More importantly, it advanced recognition of the value of planning processes that foster ongoing collaboration for policy development and implementation and that incorporate continuous learning and adjustment to take account of new data and understanding (Chikumbo *et al.*, 2001). These processes are iterative and cyclic (Fig. 6.2) and show close similarity to the processes discussed in the early planning literature (e.g. Faludi, 1973a,b; Bather *et al.*, 1976).

The model illustrated in Fig. 6.2 encapsulates several interconnected adaptive processes that are driven and constrained by strategic policies, shown as new strategies along the top of the figure. Strategies provide a policy framework for plans and actions designed to meet more specific objectives. Conservation objectives for the Regional Forest Agreement programme are identified as 'JANIS' in Fig. 6.2. The JANIS objectives provide explicit criteria for assessing the merits of different reserve designs.

Having generated each new reserve design, the next step was to assess impacts on sustainable timber supply. Figure 6.2 identifies the first stage of this iterative process as 'resource data and modelling tools', which leads into 'model runs', followed by 'new data and tools', etc. Output from resource analysis is input for 'social and economic modelling'. The end result is an agreed design for conservation reserves and multiple-use forests that provides an acceptable package of social and economic effects, followed by an ongoing process of monitoring and review. Although Fig. 6.2 does not explicitly identify stakeholder inputs, they were a major contributory factor to data collection, reserve design, evaluation, and policy decisions. The model illustrated in Fig. 6.2 has wider potential application.

Policy responses for private native forests

Among other outcomes, the Regional Forest Agreement process identified a serious need for better information on private forests to facilitate sustainable planning and management, resulting in new strategies to address these deficiencies by the Commonwealth and states. One strategy under the auspices of the National Forest Inventory is to develop and implement a 'top-down' inventory procedure to complement existing 'bottom-up' state inventory programmes

to provide national statistics. The procedure is required to provide Interim Biogeographic Regionalization of Australia (IBRA)-level information that can be consistently aggregated to meet national and international reporting needs. A complementary strategy is directed specifically to the design and implementation of a regional inventory of private native forests for planning and management purposes. Both approaches are discussed in the next section.

Private Native Forest Inventory

Need for private native forest inventory

A fundamental requirement for sustainable management of any natural resource, both for production and conservation purposes, is to quantify the landscape components. Adequate knowledge of the area and condition of the forest estate is a prerequisite for creditable land-use planning, determining sustainable yields or creating conservation reserves (Ferguson, 1996). This includes reliable current information at regional and finer wood catchment scales for strategic and operational planning (Howell and Donaldson, 1998). This in turn requires responsive, flexible, forest inventory methods and processes to provide the required information. Without strategic regional inventory information it is not possible to determine requirements for sustainable forest management or to attract long-term investment.

Continental forest sampling framework

Since its establishment in 1988, Australia's National Forest Inventory (NFI) has employed a 'bottom-up' approach using data, largely in the form of mapping, supplied by the states and territories. The majority of National Forest Inventory funds have been spent on filling gaps in mapping and 'normalizing' data collected using different methods, scales and standards (Tickle, 1996). This approach has successfully mapped the type, extent

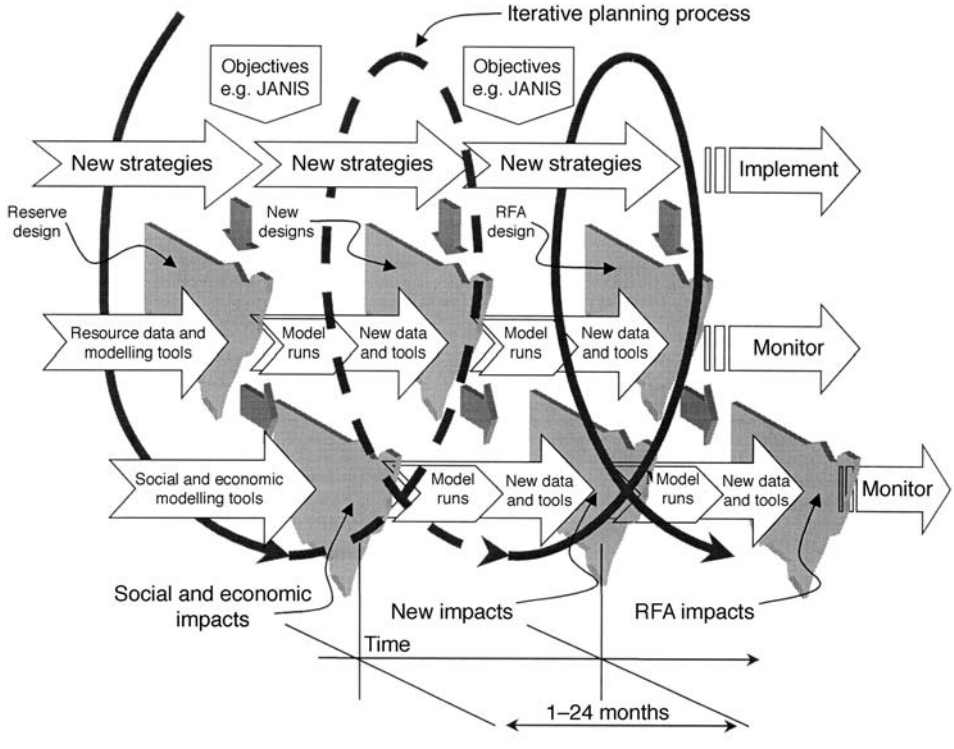

Fig. 6.2. Iterative cyclic planning process for developing and improving regional forest policy. Source: Bugg *et al*. (2001).

and ownership of forests across the entire continent at scales ranging from 1 : 25,000 to 1 : 1,000,000, in addition to completing regional mapping in priority areas and identifying information gaps. It has also demonstrated that it is not economically feasible for the National Forest Inventory to meet many of its reporting requirements in a timely manner through continued rolling-up of traditional forest mapping. Nor is it possible to obtain many of the required attributes for forest planning and management from satellite remote sensing. Therefore a new inventory approach is required.

The rolling-up method contrasts with a 'top-down' approach, such as the USA National Forest Inventory, which uses a national grid of aerial photo samples, followed by ground measurements on a subsample of permanent ground plots (Spencer and Czaplewski, 1997). The US system is very flexible and allows redefinition of stratum boundaries as new questions arise. However, although the system has been in place for more than 70 years, only recently has it produced maps of forest type and extent at resolutions finer than the grid spacing from satellite data of 1 km resolution (Hershey and Reese, 1999).

Australia's National Forest Inventory is now pursuing the development of a Continental Forest Sampling Framework to provide a top-down approach to produce data for a suite of parameters that address industry and conservation values at national and sub-national levels. Framework objectives are to provide a responsive, flexible, efficient system to provide authoritative national-level data for all forests; and establish a standardized and repeatable system to conduct successive inventories and make statements about change, relevant for 5-yearly reporting (National Forest Inventory, 2001). Importantly, it will establish a sampling design that allows for integration between different levels of assessment. This should provide for scaling up of sample data collected by high-resolution remote sensing and/or ground assessment methods, and intensification of sampling in areas where further details are required, such as regions, municipalities, neighbourhoods or properties. Another objective is to provide a framework for implementing timely, cost-effective, regional private native forest inventories (Fig. 6.3).

Regional private native forest inventory

There is wide consensus, confirmed at a national workshop in December 2000, on an urgent need for strategic, private forest inventories to provide estimates of acceptable precision over whole regions for policy and planning purposes. These should be designed to facilitate aggregation or more detailed sampling to meet information requirements at other scales, such as more detailed information on smaller operational areas, or higher level information such as for national reporting. It is neither practicable nor necessary to address all reporting levels over all areas at the same time, but

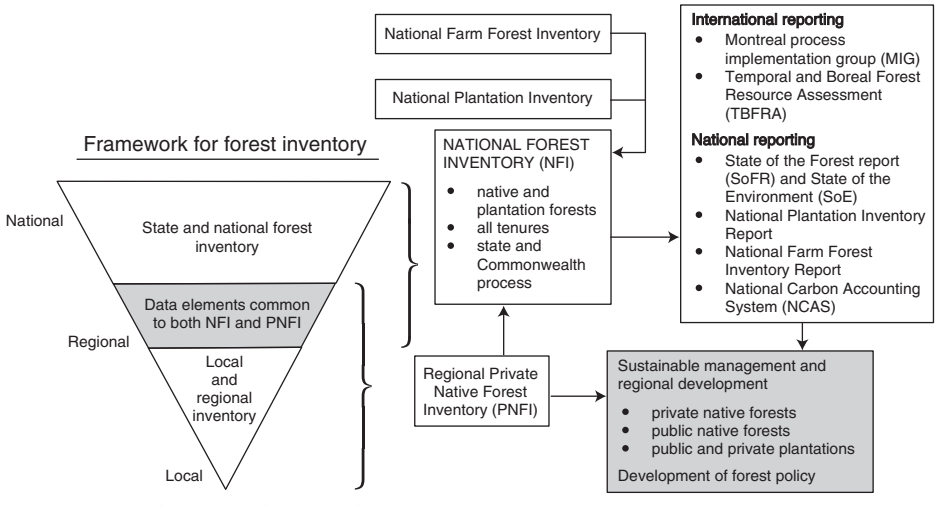

Fig. 6.3. National framework for native forest inventory and reporting.

the inventory framework should facilitate data integration across various levels. Indicative information types for three levels of inventory show that, in many cases, similar types of information are required at different scales (Fig. 6.4).

Common data elements between the three tiers (national, regional and local), combined with hierarchical sampling methods, could produce data to meet multiple stakeholder needs. For example, some or all of these requirements could be met with a mapping and sampling framework using multiple stage assessments (e.g. multi-stage, multi-phase), possibly including:

- wall-to-wall mapping with Landsat imagery to get national and regional vegetative cover and change information (Barson *et al.*, 2000), or systematic point sampling using Landsat or IKONOS imagery for quick, repeatable estimates;
- systematic or random sampling within satellite mapping units using small to medium scale aerial photographs to determine characteristics such as forest type, structure, disturbance and land-use (Anon., 1999);
- sampling within the photo-interpreted strata using large-scale aerial photo and/or laser systems to measure and interpret stand and individual tree parameters (e.g. Biggs and Spencer, 1990; Spencer, 1992; Tickle *et al.*, 1998; Lefsky *et al.*, 1999; Means *et al.*, 2000; Witte *et al.*, 2000);
- ground assessments, possibly on double samples, to obtain quantitative/qualitative data (e.g. species, stem volumes) to correlate with remote sensing data.

Figure 6.3 illustrates a national framework that provides for inventories at a range of scales to meet a variety of reporting requirements. Regardless of the framework design, the sampling requirements for individual strata at each level are similar (e.g. national, regional, local, property) to achieve a specified level of precision. However the required number of samples increases exponentially as the number of strata and level of spatial detail are increased.

Landowner cooperation

In addition to the technical aspects of inventory design, it will be crucial to gain landowner cooperation to engender broad support for private forest inventory and to gain access to properties for

Capacity to feed assessed criteria up

Level of inventory	Stakeholder/client	Information types and scale
National/state	Government agencies, policymakers, domestic and international clients, decision makers e.g. NFI, National Vegetation Information System (NVIS), Montreal Process requirements, Commonwealth Action Agenda	Broad forest communities, structure, volume/biomass, disturbance, conservation significance, tenure Mapping scales: National/state (e.g. 1:100,000 – 1:250,000) Sampling intensity fit for data analysis at Interim Biogeographic Regionalization of Australia (IBRA) region equivalents, whole of RFA regions, major river basins, etc.
Regional	Regional development groups, state governments, industry, local government, cooperatives, large forest landholders	Detailed forest communities, structure, volume/biomass, products, disturbance, conservation significance, tenure Mapping scales: local-regional (e.g. 1:25,000–1:100,000) Sampling intensity appropriate for sub-regional data analysis for catchments, wood allocation zones, Ecological Vegetation Communities, Local Government Areas, etc.
Local/farm	Landowners, cooperatives, small-scale operators, approval authorities	Detailed forest type, species, stand structure, merchantable volumes, products, regional/local conservation significance, specific rare endangered species, net harvestable area Mapping scales: local/property (e.g. 1:5,000–1:25,000) Sampling intensity appropriate for data analysis at the stand and property levels

Increasing level of spatial detail and intensity

Fig. 6.4. Key information types for three inventory levels.

ground sampling. All owners should be informed of the benefits of better information, such as better policies, improved context for business planning, and possibly site information for whole-farm planning. Such information should be provided to all property owners to gain their support, not just owners interested in timber values.

Discussion

Australia's federal system of government gives the Commonwealth major revenue raising powers through income tax, with the states and territories having limited taxing powers but major responsibilities for delivering services, including public forest services. State governments rely on Commonwealth grants, limited direct taxing powers (e.g. motor car registration charges) and, more recently, returns from a goods and services tax. These arrangements provide strong incentives for cooperation between the Commonwealth and states, plus opportunities for state–state rivalry and Commonwealth–state disagreement. Minor issues can usually be resolved by officials, but large contentious issues can inflame political debate and influence election outcomes. The states are fiercely independent and exercise a great deal of influence, which is enhanced when they are the guardians of needed information, which is often the case. The power of information ownership is moderated by community expectations and actions and Commonwealth and State Freedom of Information (FOR) legislation. While there has always been a need for Commonwealth/state collaboration to address national priorities and coordination, the need has intensified for forests because of new international obligations and increased public awareness and influence. The 1992 National Forest Policy Statement articulates strategic national priorities and directions for forest use and management. For example, it provides support for a national forest inventory and was a valuable framework for establishing the Regional Forest Agreement programme to address a major political issue.

The National Forest Inventory, established in 1988, is a collaborative Commonwealth/state programme that relies on the states to provide most of the data and the Commonwealth to coordinate its collection and synthesis. The Commonwealth also provides additional funds to assist the states in collecting important missing data. Most of the National Forest Inventory work to date has involved patching together and harmonizing sometimes disparate data from the states to compile national statistics. This process has produced valuable results in terms of products, systems and working relationships, but it has also highlighted technical and political difficulties relating to the collection and synthesis of data from a variety of agencies. Technical difficulties include reconciling different state data types, standards, scales and recording methods. Political aspects relate to factors such as data ownership, transfer, use and cost.

Data issues are a bigger problem with private land, where it is often unclear which state agency or agencies have primary responsibility. In part this reflects past tendencies for state forest agencies to be primarily responsible for managing traditional timber values in public forests and their reluctance to become involved with private forests. It also includes a traditional reluctance to share information, which is 'justified' under a variety of premises, including the notion that only experts can understand the complexities of managed forests and that novices might reach erroneous interpretations and conclusions if raw data is made available to them. Determination of sustainable timber is a good example.

In some states, government controls over private forests and collection of statistics on them are responsibilities shared among several agencies; in others it falls to no particular agency (Ryan *et al.*, 2002). Local government, the third most important tier of government in Australia, is becoming increasingly involved in private forest issues through the exercise of land-use planning powers including, for example, powers to control the clearing of vegetation and the location and treatment of plantations. Further involvement of local governments relates to their responsibility for construction and maintenance of local roads, and their leadership role in local communities. Local governments raise revenues through property taxes and state and Commonwealth grants.

The southern island state of Tasmania has an efficient private forestry model with a specific state agency – Private Forests Tasmania – primarily responsible for the collation of predominantly timber inventory data on private land. In New South Wales, situated in the mid-east, the situation is far less clear cut, with a number of agencies

having some responsibilities over regulatory aspects and provision of management advice. However the Regional Forest Agreement process made recommendations to improve state agency involvement in relation to private forests, including the establishment of a new Office of Private Forestry. Queensland, in the north-east, is in the process of changing its administrative structures for forest management, including the way that planning occurs on private land. However much of this state's efforts have so far been directed towards controlling land clearing rather than promoting sustainable private native forest management (Ryan *et al.*, 2002). While the low commercial importance of private native forests in Victoria, Western Australia, South Australia, Northern Territory and the Australian Capital Territory has traditionally provided little incentive for their state forest authorities to collect private forest data, increasing community demands for protection of conservation values are increasing the requirement for better information.

While the state and Commonwealth governments have major responsibilities for promoting wider use of efficient inventory and information-collation processes, they have also been stimulated and greatly assisted by a large array of community interest groups. For example, the Commonwealth/State National Forest Inventory, established to compile information primarily for public forests, now recognizes a clear need for information on private native forests and is initiating a new process for data collection using a continental sampling framework which will work in parallel with a regional private native forest inventory programme. Community and conservation group interest in forest management practices has in the past focused attention particularly on public forest managed by public forest agencies. More recently, a growing interest in conservation generally, and forest conservation in particular, has expanded this interest to include private forests, particularly issues of land clearing. Moreover, where some conservation groups have achieved big conservation gains on public land they now seek to extend their gains on private land. This brings issues of land ownership rights and responsibilities into sharp focus, with attendant potent political implications. Therefore, the past lack of attention, even indifference, to private land is changing. This change is necessary to encourage sustainable management of private native forests and meet Australia's international obligations relating to forest management and statistics.

This new focus presents technical as well as social challenges. The technical challenges relate to the vast extent and diversity of Australia's private native forests which require efficient inventory methods. The social challenges relate to the large number of forest owners and the need to persuade them to place a higher value on good information for land-use planning and management, including potential gains to them individually and collectively. Given the independence of many Australian farmers and their general scepticism of government, it will be no mean task to change their attitudes. However self-interest can be a strong motivating force. For example, lack of market information often puts private growers at a serious disadvantage, through them not realizing how valuable their timber might be. This frequently results in a buyer's market. Furthermore, even if local timber prices are known, they are commonly based on prices paid for wood from government forests, which may not reflect their true marginal market value.

While forest grower groups and farm groups at national and state levels now recognize the requirement for, and value of, better information, this is not always the case with individual landowners. Landowners can bring substantial political pressure to bear to defend what they often perceive as a right to privacy in relation to information about their properties and farming enterprises. Ironically, Australian farmers have been providing agricultural statistics to assist policy makers for many years. Why attitudes to forests appear to be different is hard to understand, but it could be related to different community perceptions about the wider values of forests. Although the Regional Forest Agreement programme provided many lessons on methods for engaging stakeholders, including landholders, many problems still remain. These must be addressed and solutions found if we are to implement sustainable management of this valuable resource.

The substantial diversity of landowners and their intentions relating to use of their forests provide significant challenges in land management. Whilst peak stakeholder groups, such as Australian Forest Growers and National Farmers Federation, recognize the requirements for increased

information on private forest land, the rights and privacy issues have not been clearly addressed. Lessons can be learned from the methods used to engage stakeholders in the Regional Forest Agreement programme and the methods employed in the National Forest Inventory where growers provide data on their private plantations under 'commercial in confidence' rules that protect their privacy by only publishing aggregated data that mask details on individual holdings (Wood *et al.*, 2001).

Conclusions

Federal initiatives commencing in 1988 provided a foundation for improved cooperation between the states and Commonwealth for the preparation of a National Forest Inventory. However there has been no mechanism to secure ongoing funding or to target forests where forest inventory has traditionally not occurred (i.e. privately managed native forests). The system to integrate public forest data into the national system is a bottom-up approach that integrates data from state inventory programmes. Over time, improved methods have evolved to integrate state data obtained by a variety of methods and standards to meet each state's objectives.

New requirements for national/international reporting and pressures on regional forests for sustainable forest planning covering all forests require more effective methods for obtaining information. These should combine top-down and bottom-up approaches that complement existing state programmes, utilize combinations of state-of-the-art remote sensing and ground assessment methods, and have sound consultation mechanisms for regional stakeholders, including forest growers. The challenge is to identify and implement 'best practices' to efficiently collect consistent, appropriate data for all of Australia's forests.

Two recent government initiatives that will support this aim are a programme to develop a continental sampling framework covering all forests and a complementary regional private native forest inventory programme. Both programmes present considerable technical challenges, including the large area and dispersed nature of private forests and the relatively small number of suitably qualified people to do the work. There are also major social challenges relating to perceptions about forestry in general and ownership rights for private forests in particular. Doubtless many factors are involved, but it is essential that we quickly obtain a better understanding of them so that barriers to the collection and dissemination of important information can be dissolved. This is all the more important in today's world where there is increasing understanding of the fact that many natural resource management problems are not confined to individual properties and that potential solutions can only be addressed effectively at landscape and catchment scales.

Other major natural resource management issues in Australia that illustrate the need for catchment and wider scale considerations include land degradation, salinity and river quality. Reafforestation in strategic locations using native species could contribute to long-term solutions to these problems. As for private native forests, this will require better systems for engaging landholders to get their support to undertake assessment and monitoring programmes.

Significant progress has recently been made but it is only the start of a long journey.

Acknowledgements

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Endnote

[1] The definition of 'forest', as used by the NFI and based on the 1992 National Forest Policy Statement is:

> 'an area incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres, and with existing or potential projected crown cover of overstory strata about equal to or greater than 20%'.

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