

An Australian Standard For Valuing Commercial Forests

Including, but not restricted to, forest valuations required under the Corporations Act, or forest valuations which require adherence to Standards AASB 1037 and AAS 35

Although we regard this document as outcome of a lengthy drafting process, we recognise that the topic is changing and that amendments will be required from time to time, and we have therefore prepared it in a web-based format and invite comments from any who are interested in its application.

Please note that this standard has been prepared as a working document and has no official standing.

Minor comments are preferred as marked amendments to paper copies, rather than as electronic revisions and should be sent to The Secretary, Association of Consulting Foresters of Australia, PO Box 4263, Kingston, ACT, 2604.

Association of Consulting Foresters of Australia
in collaboration with
Agriculture, Fisheries and Forestry, Australia

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INTRODUCTION

Several years ago, the Association of Consulting Foresters of Australia (ACFA) decided to prepare a handbook to be used by members who were involved in determining estimates of the value of private forest estates, but various delays were encountered. In the meantime, the New Zealand Institute of Forestry prepared *Forest Valuation Standards*, which was used in Australia in lieu of a recognised Australian methodology. This publication had the disadvantage that it did not use Australian case studies, did not cover native forests and followed New Zealand approaches to taxation, etc. With the adoption of the Australian Accounting Standards for Self-Generating and Regenerating Assets (AAS 35 and AASB 1037*) it became more obvious that a more formal methodology and standard for valuing Australian forests were needed urgently.

Fortunately, Agriculture Fisheries and Forestry, Australia (AFFA) was able to assist us with funding, otherwise we could not have produced this standard in a timely fashion. However, AFFA also saw the need for a standard to be used when valuing all commercial forests, so the original aim of preparing a handbook to be used by our members when valuing private forests was expanded to a standard with a broader application.

A standard such as this cannot provide a recipe for all situations but it does give sufficiently detailed guidance with some flexibility for forest valuers to either accept its approaches or to argue a case for alternatives. ACFA stresses the fundamental need to **document, disclose and detail** the approaches that are adopted in any forest valuation, especially if they depart from this standard. In the text, some passages that should be considered mandatory are presented in bold type.

The Association is greatly indebted to Ian Ferguson, former Professor of Forest Science, University of Melbourne who prepared this draft. His efforts turned this project from a longed-for document into reality.

The Association is committed to upholding high principles in forestry consulting, and sees the *Australian Standard for Valuing Forests* as a major contribution to this commitment. The Association also realises that it will have up-date the standard as procedures change and as experience is gained in applying it.

ACKNOWLEDGEMENTS

Many people have contributed to this project. We owe thanks to numerous people in Government agencies, companies and consultancies that have contributed to understanding the problems and for critical comment. ACFA also wishes to thank Tony Fearnside, Jerry Leech, Rick Baker, Chris Borough and Gerry Cross for their inputs to this project. The New Zealand Institute of Forestry kindly allowed us to draw on their valuation standard and provided much-valued comments.

Agriculture, Fisheries and Forestry, Australia supported the project by providing encouragement, funds and critical comment. Financial support was also received from Forest Enterprises Australia Ltd, Timbercorp Ltd and Gunns Ltd, while many public and private forestry organizations supported the project in principle.

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- In this document, we refer to AASB 1037, but for the purposes of valuing forests, this can be taken to refer to AAS 35 also, since the provisions are similar. AASB 1037 is the reference for mandatory reporting under the Corporations Act whereas AAS 35 is used for financial reporting by public sector institutions and other financial reporting not mandatory under the Corporations Act. AASB 1037A and AAS 35A provide supplemental standards deferring the implementation dates. Both of these standards can be viewed at www.aasb.com.au

1. PURPOSES OF FOREST VALUATION

1.1 Purposes differ Forests provide many potential sources of value for a wide array of beneficiaries that range from a small landowner selling a parcel of standing trees for current or later use in wood production to the global population deriving probable benefits or costs in relation to global warming through carbon sequestration or carbon release by forests.

1.2 Commercial not non-market uses This standard deals **only** with the valuation of commercial goods or services by entities that have private (i.e. legally assigned) property rights over those forests or standing trees likely to provide commercial goods or services. It is designed to assist those who need to value their forest estate for the purposes of financial reporting, financial transactions or financial management. It does **not** deal with the valuation of forest estates that supply **unpriced** or **non-market** goods and services.

1.3 Purposes include The purposes of this standard include valuation for:

1. Formal financial reporting as required by the Corporations Act.

The Australian Accounting Standard Board (AASB) Standard AASB 1037 makes the use of the so-called Self-Generating and Regenerating Asset (or [SGARA](#)) Standard - mandatory for financial reporting of commercial forests by Australian entities in financial years ending on or after 30 June 2001. AAS 35 is the appropriate standard for entities not subject to the Corporations Act.

Additional requirements are specified for Prospectuses, especially those for Afforestation Managed Investment Schemes, and Afforestation Investment.

Further details regarding these requirements are provided in later sections.

2. Financial transactions

Financial transactions involving forests and plantations involve many different purposes such as:

- a seller - wishing to establish a reserve price,
- a buyer- a maximum price,
- a lender or borrower- a collateral value,
- an investor or company- an equity value,
- an insurer or claimant- an insured value,
- an inheritor- a value for a deceased estate,
- a taxpayer- a value for taxation purposes, or
- an insurer or claimant- a compensation value.

For these valuations the strict use of AASB 1037 and AAS 35 may be misleading and inappropriate.

3. Financial management

Good stewardship requires that owners and managers periodically revalue and assess the past and prospective financial performance of the enterprise. Again, AASB 1037 and AAS 35 may be quite inappropriate for these analyses.

1.4 Mandatory requirements in this standard

Any paragraphs shown in bold type, as shown here, should be regarded as a mandatory requirement for members of the Association of Consulting Foresters of Australia and of the Institute of Foresters of Australia.

This use of bold type does not necessarily indicate mandatory requirements under AASB 1037 or AAS 35.

It should be noted that AASB 1037 does not allow for non-disclosure on confidentiality grounds in formal reporting under the Corporations Act.

1.5 Agreed terms of reference

Any professional valuation requires an agreed set of Terms of Reference, whether written or verbal, to which the consultant should formally respond in accepting the task, and in reporting.

1.6 Independent valuations under the Corporations Act

The distinction between an [independent valuation](#) and a less-formal valuation needs to be stressed. The Australian Securities and Investments Commission (ASIC) has strict guidelines relating to independent valuations when intended for publication to a section of the public and issued for a purpose regulated under the Corporations Act. Full details are available from www.cpd.com.au/asic/pn/ in Practice Notes 42 and 43. The following represent a summary of key points regarding independent valuations.

In the case of independent valuations, the commissioning party should provide the expert with written instructions that clearly set out the scope and purpose of the report and ensure the independence of the expert in writing the report and in drawing conclusions. It is therefore inappropriate for the independent expert to be involved in discussions about, or in the drafting of, the proposal.

Independent experts are expected to provide readers of the report with an objective and unbiased assessment, independent of an interested party. Failure to disclose interests may constitute misleading or deceptive conduct under s1041H of the Corporations Act. Note that the onus of the proof of reasonableness of forecasts used in valuations is on the person making the forecast. This is a reversal of the usual onus of proof.

In the report, experts should disclose the material that they have relied on and assumptions used in their assessment. They should also disclose, to the extent necessary to assist readers to assess the value of the report:

1. the origin of the material used in it,
2. the inquiries made,
3. the time constraints under which the work was done,
4. whether access was refused to information on which a fuller appraisal might have been based, and any potential impact of such refusal.

The expert's statutory liability cannot be affected by any disclaimer in the report. If unable to give a definite answer, the expert should either decline to provide a report, or explain the nature and causes of the uncertainties involved.

The Association of Consulting Foresters of Australia:

- expects members to adhere to the above points in situations in which the Australian Securities and Investments Commission guidelines apply,
- encourages their use in other valuations, where appropriate, and,
- recognises that not all valuations are independent and that the above points may not be fully appropriate for these less-formal valuations (appraisals).

1.7 Managed investment schemes and investor's guide to investment

Adherence to the *Disclosure Code of Practice for Afforestation Managed Investment Schemes* and to the *Investor's Short and Annotated Guides to Afforestation Managed Investment Schemes* (Australian Forest Growers' <http://www.afg.asn.au>) should be mandatory for members of the Association of Consulting Foresters of Australia and Institute of Foresters of Australia, when engaged in valuations.

These documents specify reports by independent foresters and normally also involve some form of valuation.

1.8 Other valuations

Less-formal valuations (appraisals) that do not come under the Corporations Act do not necessarily have to meet the above requirements. Not all valuations are independent and some landowners may not be equipped or prepared to provide written instructions. However care should be taken not to compromise the valuation by the expected use.

However, the possibility of litigation over the outcome of a valuation or appraisal suggests that the requirements embodied in an independent valuation need to be considered carefully in undertaking less-formal valuations or appraisals, and in writing a report. Disclosure is clearly a very critical element.

2. DEFINITIONS, REFERENCES, CODES AND STANDARDS

- 2.1 Definitions Throughout this Standard, definitions of key terms are generally provided through hyperlinks to a list of definitions, explanations, or guidelines, except where exhibition in the text is critical to understanding. Normally, the hyperlinked definition is only provided at the time the term is first used.
- 2.2 References Hyperlinks to publicly accessible websites are also used for reference to the various codes and materials that are relevant to valuation. The matters covered in these publications are not repeated in this document, because they may be changed or updated from time to time.
- Footnotes are used to provide references to published literature, not available on the web. In general, these references have been confined to current publications readily accessible in Australia.
- There is, of course, a much wider array of information available in journals such as *Australian Forestry*, *Australian Forest Grower*, *Tasforests*, *New Zealand Journal of Forestry* and *New Zealand Journal of Forestry Science*, in publications and unpublished research theses in research organizations and universities, and on the websites of the various State agencies with responsibility for commercial forest management.
- 2.3 Codes Reference to relevant Codes such as the various State Codes of Forest Practice are made through hyperlinks to publicly accessible websites, where available, or through footnotes to published material.
- 2.4 Accounting standard for financial reporting The Australian Accounting Standards Board has published two accounting standards, AAS 35 and AASB 1037 that relate to Self-Generating and Regenerating Assets (known as SGARAs) applicable to forests or plantations in the public and private sectors respectively.
- The provisions of these standards are mandatory for general purpose financial reporting for financial years ending on or after 30 June 2001.**
- The requirements of AASB 1037 represent a major change in valuation for financial reporting, therefore this standard is directed to describing methods to meet its requirements.
- 2.5 Financial transactions and management Valuations for financial transactions or management may involve additional considerations and, sometimes, different outcomes to those for financial reporting, as in the case of the differences between a seller seeking to establish a reserve price and a buyer, a maximum price.

Nevertheless, the status of the accounting standards is such that they are bound to form important references or benchmarks in these other valuations. The definitions and methods associated with AASB 1037 therefore provide an important basis for all forms of forest valuation.

2.6 Net Market Value AASB 1037 uses the term Net Market Value. This is a critical term for the valuation of SGARAs.

Net Market Value is defined as “the amount that could be expected to be received from the disposal of an asset in an active and liquid market after deducting costs expected to be incurred in realising the proceeds of such a disposal”.

2.7 U.S. market value Although not an Australian standard, the more expansive definition of ‘market value’ by the Appraisal Standards Board of the Appraisal Foundation¹ in the United States follows a very similar path to the above definition and subsequent qualifiers in AASB 1037.

“The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus.

“Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

1. buyer and seller are typically motivated;
2. both parties are well informed or well advised and acting in what they consider their best interests;
3. a reasonable time is allowed for exposure in the open market;
4. payment is made in terms of cash in United States dollars or in terms of financial arrangements comparable thereto; and
5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

2.8 SGARAS - living trees

AASB 1037 introduces key terms with specific definitions such as [Non-living Produce](#). These have been adopted in this Handbook to avoid confusion. The complementary term [Living Trees](#) has been coined and defined in this standard because, although different to conventional forestry terminology, it relates more clearly to its counterpart in the SGARA standard.

AASB 1037 rigorously separates the value of the Living Trees (SGARAs) from that of the lands on which the trees grow (non-SGARAs).

¹ See Glossary of Uniform Standards of Professional Appraisal Practice, Appraisal Standards Board, The Appraisal Foundation <http://www.appraisalfoundation.org/USPAP2001/>

2.9 AASB 1037 applies to forestry leases but not to non-commercial uses of forests

AASB 1037 applies to:

- **SGARAs other than those held for the primary purpose of aesthetics, heritage, ecology, the environment or recreation,**
- **exclusive rights obtained through leases or similar arrangements over specific SGARAs, as if those rights are themselves SGARAs.**

2.10 AASB 1037 prescriptions

Within a forest estate, Living Trees (and other SGARAs) are different from non-living assets because they undergo change over time through growth, mortality, treatment and natural hazards. These changes affect the discounted future net revenues, changes in the future prices of products and the future costs of management operations. Measuring the Net Market Value of a forest requires that account be taken of all these sources of possible change in future net revenues at each reporting date.

AASB 1037 prescribes that:

- 1. SGARAs be measured at Net Market Values,**
- 2. increments and decrements in Net Market Values be recognised in the profit and loss statement in the financial years in which those increments or decrements occur,**
- 3. the Net Market Value of Non-living Produce extracted from SGARAs (less the costs of extraction) determined immediately after it becomes non-living be recognised in the profit and loss statement in the financial year in which it occurs,**
- 4. the cost of Non-living Produce of SGARAs is deemed to be the Net Market Value of the Non-living Produce immediately after it becomes non-living,**
- 5. specific disclosures are made in respect of SGARAs.**

Further details of the disclosures required are provided in sections 5, 6 and 7.

3. VALUATION METHODS

The definition of Net Market Value for SGARAs is capable of evaluation by several methods, depending on the data that are available, or that can be readily obtained. The principal methods (transactions, lump sum and net present value) are discussed in the three sub-sections that follow.

ACFA does not necessarily support the view in AASB 1037, that cost may be the best indicator of Net Market Value.

3.1 TRANSACTIONS METHOD

3.1.1 Transactions data

Given that the definition of Net Market Value is most clearly identified with arms length transactions in the market place, the search for transactions data on the sale prices of similar forests (or plantations) is an initial starting point for any valuation of a forest.

For valuations required to meet AASB 1037 it should be noted that valuation based on the transaction method is likely to be for a composite asset including SGARA and non SGARA components.

3.1.2 Relating data to forest being valued

Comparisons of forest values based on transactions data need to take account of the differences in:

- species,
- location,
- scale,
- site productivity and uniformity,
- age,
- stocking,
- log quality,
- access and harvesting conditions,
- any in-place wood supply agreements, and,
- natural and man-made hazards.

Differences in market conditions also need to be taken into account including those due to:

- inflation,
- cyclical (eg, housing, business cycles) and secular (long term) trends in product prices at particular points in time relative to the current,
- the numbers of potential buyers in the relevant location, and
- strategic factors, such as market entry or exit and consolidation of estates.

Some of these differences can be taken into account quantitatively by adjusting for differentials that are well established in the market, such as the added cost of log haulage from a more distant location. Others rest on professional judgement of the effect of the differentials in terms of cost or price. Manley and Bell² provide an example of an analysis of sales by estimating a relationship between the prices paid for New Zealand State-owned plantations and their underlying characteristics.

² Manley, B. and Bell, A., 1992. Analysis of the value of the State plantations sold in 1990. *NZ Forestry* 42(4): 22-7

- 3.1.3 Disclosure **Whatever the form of the adjustment used to develop a transactions-based value, the method (not necessarily the data, if confidential) needs to be disclosed in the valuation report.**
- 3.1.4 Transactions data not available In Australia, markets for forests are thin and transactions few and sometimes far between both in time and location. While this may represent a fundamental limitation, the above method needs to be pursued as far as is practicable, if only to provide a check on other methods of valuation which rely on less direct evidence.
Where direct transactions data are not available, AASB 1037 prescribes that:
the best indicator of the amount that could be received from the disposal of the SGARA in an active and liquid market must be used to measure Net Market Value, taking account of all relevant information.
- 3.1.5 Reporting land value Even if transactions data are lacking for forest estates, they will normally be available for land under other uses, either directly through transactions or indirectly through valuations by the State Valuer General or similar authority. These data need to be collected for any forest valuation because they provide the basis for the valuation of the land on which the trees are growing.
Depending on the client's instructions and proposed use of the report, the valuation of land will usually be carried out by a Certified Practising Valuer who is a member of the Australian Property Institute.
Under the Australian Accounting Standards for financial reporting, the value of land has to be reported separately from that of the SGARA and according to the standards relating to [non-current assets](#) (AASB 1041 "Revaluation of Non-Current Assets" and AASB 1010 "Recoverable Amount of Non-Current Assets").
AASB 1037 does not require land to be recognised at current value in the statement of financial position. Also, such a value should more properly only be used when the highest and best use is not the current use.

3.2 LUMP SUM VALUE OF LIVING TREES METHOD

3.2.1 Lump sum value of living tree Small forests or plantations for which suitable transactions data are not available can be valued by estimating separately the value of the land and the value of the Living Trees. Small forests or plantations are those in which the harvest and sale of the resulting wood could potentially be arranged in a matter of a year or so without the undue disruption of markets and prices otherwise associated with a forced sale of a substantial volume of wood.

Under these conditions, the value of the Living Trees can reasonably be estimated by applying the current prices to the estimated volumes of wood in the various grades and assortments that would be expected to be available if the Living Trees were to be harvested in the base year, and deducting all costs borne by the owner that are associated with the harvesting and transport to market.

In short, this is the ‘lump sum sale’ approach to valuation of Living Trees. The value of land would need to be established by examination of transaction data on the prices obtained for comparable land or from official valuations.

3.2.2 Adjustment for thin or illiquid markets Because State agencies or private companies with large forest estates sometimes dominate local markets for wood, the assumption of a lump sum sale at going prices needs to be treated with care. The test is whether those prices could be achieved in an active and liquid market.

If the market is neither active nor liquid, some adjustment of prices may be necessary and disclosure of the basis of professional judgement would be necessary.

3.2.3 Limited to small forests and plantations For reasons discussed in the next section, this method cannot be applied to medium or large-sized forests or plantations. The test to be applied is whether the trees could be sold in a lump sum sale in an active and liquid market without major disruption by way of impact on price. A major disruption might be a potential decrease in price of more than 20%.

3.3 NET PRESENT VALUE METHOD

3.3.1 Lump sum method seldom applicable to large and medium forests

Large and even medium-sized forest estates or plantations pose a problem if ample transactions data are not available, as is often the case. It is simply not possible to quit the volume of Living Trees from such a forest in a short period of time.

The following table sets out the approximate ratios of the volume of Living Trees in a large estate relative to the annual cut for a hypothetical long-term sustainable business.

Approximate ratios of the volume of Living Trees to annual cut for long-term sustainable business.

Forest type	Main product	Rotation (yrs)	Ratios
Native forest (eg, jarrah)	Sawlogs	200	100
Native forest (e.g. Blackbutt)	Sawlogs	80	40
Pine plantation	Sawlogs	30	15
Blue gum plantation	Pulpwood	15	7

The actual ratios depend largely on the number of years over which planting has been conducted in the case of plantations, or the distribution of age of size classes in native forests. This highlights why the Tasmanian Auditor-General³ inferred that valuation of the State-owned forests based on immediate liquidation of the volume of Living Trees was meaningless. Such an assumption is not consistent with the disposal of an asset in a liquid and active market in which to quote AASB 1037: 5.2.2:

‘Net Market Value is the net proceeds ... expected to be received in the ordinary course of business, rather than the net proceeds from disposal ... from a distress sale.’

3.3.2 Net Present Value - proxy for Net Market Value

Under these circumstances, the best indicator of Net Market Value in an active and liquid market is likely to be the [Net Present Value](#) of future cash flows.

3.3.3 Discounted value of future net revenues

The Net Present Value method entails predicting the future flows of wood over time and the prices and costs that are involved, and discounting the resulting net revenues back to the base date of the valuation. The term ‘Net Present Value’ has many synonyms, including Present Value, Discounted Cash Flow, Discounted Net Revenue, and Land Expectation Value. The latter reflects the long history of this form of analysis in forestry,

³ McHugh, A.J., 1993. Audit Report, Forestry Commission 30/11/93. The author, Hobart.

attributable to Faustmann⁴.

AASB 1037: 5.3.2 (d) stipulates that:

A current market-determined interest rate reflecting the risks associated with the asset should be used for discounting.

3.3.4 Limited to existing land base

The future flows of wood are to be predicted from the existing forest or plantation, plus any other land for which there is a commitment to purchase and afforest.

The land base does not include future new plantings for which no commitment to purchase or lease the land has been made.

Valuations to meet AASB 1037 must take care to ensure that the appropriate land base is used.

The land base used may be quite different for other forest valuations, and in these cases it is necessary to document and disclose what has been used to meet the Terms of Reference, and why.

3.3.5 Not to include re-establishment cost

Where a single rotation forms the basis for valuation of the Net Present Value of a SGARA, as under AASB 1037:5.3.2.(d), the future cash flows cannot include the cost of re-establishing the forest or plantation after harvesting.

The Accounting Standards Board acknowledges the need for professional judgement in applying the Standard, noting that the disclosures required should provide users with information about the assumptions made in determining Net Market Values in the absence of active and liquid markets.

Costs associated with returning land to an alternative land use for sale can however be included in the valuation of the SGARA.

The single rotation is considered to end when all produce has been extracted and sold, and all harvesting debris is returned inside the outside row of tree stumps.

3.3.6 Shorter rotations - take account of subsequent rotations

A valuation of Net Present Value on the basis of a single rotation will produce a lower estimate than the classical Faustmann method, assuming that re-afforestation is profitable. The magnitude of that bias is only likely to be of major concern for forests or plantations using short (less than 40 year) rotations.

Where re-afforestation is not profitable at the discount rate chosen or specified, the consultant should inform the owner of this and the reasons. See section 6.3.4 for alternative methods for treating such negative values in the valuation.

⁴ Faustmann, M., 1995 [1849]. On the determination of the value which forest land and immature stands pose for forestry. Trans. W. Linnard), *Journal of Forest Economics*, **1**(1). 7-44.

Valuation based on a single short (less than 40 year) rotation may be inconsistent with the basic principle of seeking the best indicator of Net Market Value of a SGARA. Future rotations may need to be taken into account, as indicated in Sections 5 and 6 of this document, especially 6.3.5.

3.3.7 Profit and loss account implications

Where land is owned, as distinct from leased, the estimated Net Present Value relates to land and trees together, as well as other assets, since they are inseparable in the analysis. The value of the SGARA embodied in Living Trees has then to be separated from that of land and trees combined by deducting the value of the land on which those trees grow. The value of the land is NOT a SGARA.

Annual changes in the SGARA value of the living trees are shown directly in the Profit and Loss account, whereas those in the (non-SGARA) value of land are not. The values of non-SGARA components such as land are shown only in the “Statement of Financial Position” account as a Non-current Asset. See AASB 1040 “Statement of Financial Position”. Changes in these values do not show in the Profit and Loss account until realized by sale or, in the exceptional case, by write-down to a recoverable value.

3.3.8 Dampening of cyclical fluctuations in SGARA value

This treatment of Living Trees as a SGARA means that annual growth, mortality, treatment and/or thinning all have a potential impact on the annual Profit and Loss statement, even though not realised in net cash revenues. Furthermore, in the short run, inability to harvest at the scheduled age because of depressed market conditions may still be associated with an **increase** in the SGARA value, and hence additional profit on the Profit and Loss account, because those trees are growing SGARAs. The effect is to reduce the effect of short run changes in SGARA value stemming from short run changes due to the business cycle.

There are obvious limits to this process if, in the long run, supply continues to increase relative to demand. In this event, the price of the product will be forced down, reducing the most recent SGARA value, and may thus reduce imputed profit or even create a loss.

4. VARIANTS TO PRINCIPAL METHODS

4.1 Special issues

While the three methods described above span the principal methods to be used in valuation, some issues arise for forest estates or plantations with other or special characteristics.

The details of the methods to be applied in these cases vary widely and largely rest on professional judgement. That judgement should reflect the following principles.

4.2 Immature forests

Immature forest estates and plantations often have no active or liquid market for the Living Trees because they are too young and small to be saleable. Net Present Value methods can often be applied to immature forest estates, and are generally appropriate for financial reporting.

In the event that an immature plantation of very young age has a negative Net Present Value, and the SGARA valuer is satisfied that the discount rate used is appropriate, the loss transfers to the Profit and Loss account accordingly. Section 6.3.4 of this standard must be considered. The client will presumably heed this warning in entertaining any future planting.

Another method may be justified for insurance purposes (but not SGARA valuation) where written into the contract. In the case of plantations, Living Trees are commonly insured against fire damage up to an age at or about which they can yield saleable products – typically about 10-15 years for a radiata pine plantation. The basis of the insurance is that fire-killed Non-living Produce is generally unsaleable at these ages. In this event, the insurer is generally liable for the compounded cost of establishment. Hence the compounded cost of establishment, or some agreed basis reflecting site productivity and costs, may be used to value immature plantations for insurance purposes.

This method should not be used for SGARA valuation because it does not conform to the underlying principle of determining the best estimate of Net Market Value in an active and liquid market. This also serves to illustrate that SGARA standards are not always appropriate for all valuations.

4.3 Intermediate cases

Some forest estates do not meet the criterion of small size, because the Living Trees cannot be harvested and sold in the space of one year, or because they are relatively newly established, or are without age or size classes typical of the expected final crop at rotation age.

Transactions data are often lacking for such intermediate cases. The Net Present Value method can be applied, but on what assumptions, when no experience is available on the sale of the species in the particular area?

The tenor of AASB 1037 indicates that the choice of assumptions must rest on the consultant's judgment of the best indicator of Net Market Value, together with sufficient

disclosure of the assumptions, other than confidential data, to justify that choice.

4.4 Privately-owned native forests

For native forests in Australia, the State agency concerned is often the dominant supplier because of the extent of publicly owned native forest managed for wood production and other uses. Markets for the sale of wood from privately owned forest might then become erratic in price and conditions because of 'take or pay' clauses attached to the State supply contracts or agreements. Similar problems may arise wherever one grower (native forest or plantation) dominates the market because of size of holding and contracts with purchasers.

The tenor of AASB 1037 indicates that the choice of prices must rest with the valuer's judgment of the best indicator of Net Market Value, together with disclosure of the rationale (see Section 6). For any of the three principal methods, this may involve a reduction in price and/or a deferral of harvest from the optimum age, in order to recognise the realities of an uncertain and difficult market.

4.5 Publicly-owned native forests

Most of the provisions pertaining to the Net Present Value method for large forests can be applied to publicly owned native forests managed for multiple uses that include wood production. However, there are notable differences in the detail of accounting and in the interpretation of the final value. Publicly owned forests managed for multiple uses generally involve joint production of wood together with non-commercial uses and services and it is this mix of SGARA and non-SGARA considerations that makes such valuations problematic.

4.6 Multiple use constraints

If the other uses of multiple use forests were commercial, there would be comparatively little problem in extending the principles already enunciated to cover the valuation of joint production of those uses. But most are not. In addition, our knowledge of the inter-relationships between uses is commonly limited and it is therefore necessary to protect the supply of them by relatively arbitrary constraints and devices.

In order to maintain natural genetic diversity, improved genetic stock cannot be used in many publicly owned native forests in Australia. More reliance is placed on natural regeneration or the use of planting stock raised from local seed. Rotation lengths are extended⁵ well beyond the economic optimum for wood production in the interests of maintaining a diversity of structural ecosystems and communities, and associated habitat for fauna. Silvicultural systems may be modified in places to protect scenic, habitat or conservation values, clear-felling systems being modified strongly or replaced by selections systems. Habitat or nesting trees have to be retained for fauna protection,

⁵ For example, the rotation length for mountain ash forest in Victoria is generally at least 80 years, often more, compared with the optimum economic length of about 50 years.

to the potential detriment of the growth of trees in the immediate vicinity containing or producing commercial wood. The quality of water production is protected by buffer strips in which harvesting is allowed along streams and rivers and by amelioration measures following the completion of harvesting along snigging trails and on landings. The aggregate quantities of wood to be removed from a region are also constrained to ensure sustainability of supply.

4.7 Net present value circular for publicly-owned native forests

As a result, the forest manager is no longer free to choose the most economically efficient manner of operation. The future pattern of wood production flows and cash flows do not reflect the entrepreneurial choice that might maximise the value of the forest as a wood producer.

Any valuation based on Net Present Value is therefore circular in that it simply reflects the planned pattern of regulated multiple use of that forest - not the optimum value when used for wood production alone under minimal constraints. Notwithstanding this circularity, the Net Present Value of wood production in a multiple use forest may provide a useful comparison over time that summarises any changes to the regulatory conditions, as well as to other conditions affecting wood production.

It does not, however, provide any useful guidance as to the return on capital investment, either singly for wood production or for other or all uses, because of the strictly derivative nature of the Net Present Value, given the net revenue flows.

4.8 Disclosure of constraints for native forests

The tenor of the SGARA standard recognises the issue of constraints imposed on native forests, especially on publicly owned forests, and thus would require an explicit statement of the constraints and an additional valuation that sets out the Net Market Value in the absence of the restriction(s).

4.9 Joint venture and share-farming forests

In the case of joint venture forest estates, the normal method of valuation will be to deal with the forest as a whole and then to apportion the Net Present Value in accord with the terms of ownership in the joint venture.

Similarly for share farming, although in this case the apportionment of value between the parties will probably require individual calculation of Net Present Values for each party, given that the cost and revenue stream are often borne unequally and at different times.

4.10 Other forms of valuation

As noted earlier, not all valuations or appraisals are concerned with financial reporting. It is not possible to set standards for each and every other form of valuation. The Terms of Reference should clearly state the purpose of the valuation, enabling the consultant to develop an appropriate approach.

5. FOREST INVENTORY AND YIELD ESTIMATION

5.1 FOREST INVENTORY

5.1.1 Check legal basis of ownership and rights

Valuations of the land on which forests or plantations are grown need to be based on a secure knowledge of the legal basis of ownership.

Appropriate checks on the location and condition of and assets on that land need to be carried out as an initial part of valuation of the forest or plantation.

A valuation report should declare or disclose the following.

- **the legal basis of the property rights to Living Trees and Land,**
- **the boundaries and areas of land involved,**
- **the boundaries and net effective areas of plantation or forest by age class or structural classes, site productivity, stocking, and condition,**
- **the sources of area data, maps, and methods used to develop the area statements,**
- **a statement as to the reliability of the area estimates.**

Ownership can be established through inspection of the legal title, available from the respective State Land or Title Registries. Note should be taken of any rights of neighbours, covenants, encumbrances, or easements thereon. Most States have special legislation relating to Forestry Rights that enable the Living Trees asset to be separated legally from the land, without necessarily requiring registration of that assignment of ownership on the title. Under these conditions, written assurance should be sought from the registered owner of the ownership status of the Living Trees. Separate or related rights are, in some States, extended to Carbon Rights and global warming issues.

5.1.2 Check boundaries and net effective areas

Locations specified on titles should be checked against [GPS measurements](#) or other precise measurements on the ground. Geographic Information Systems, aerial photography or rectified satellite images should also be used to check the title boundaries and those of the planted areas and the location of other assets and land uses.

In the case of larger estates which have well-established and documented databases or land registries, sample surveys using Global Positioning Systems may suffice to check additions to the database, provided periodic full audits have been carried out.

The identification and mapping of net effective areas of forest or plantation is vital as it distinguishes those areas from others which are either carrying no trees or whose trees are or will be, when mature, of such low aggregate volume, average stem size, or quality as to be uneconomic to harvest.

Any report should include full details of the description of the land, its characteristics and climate, and any other

matters that affect its potential commercial yields.

5.1.3 Forest inventory

The process for assessing the merchantable volumes of living trees in any substantial forest estate is complex. [Forest inventory](#) is unlike other spheres of manufacturing or agriculture inventory.

Objective sampling methods should be employed for forest inventory. These include stratified random, systematic sampling or random sampling and may entail multi-stage or double sampling. Stratification is commonly provided from interpretation of aerial photography of 1:25,000 or better scale. The intensity of sampling can be varied in stratified random sampling to provide better precision for a given number of plots.

Where objective methods are not used the methodology used must be fully described, justified and documented.

Private Forests Tasmania provides a *Farm Forestry Toolbox*⁶ on CD that contains useful guidance and assistance for property survey, tree volume measurement, inventory, estimation of costs and revenues, and for calculating the Net Present Value of a single rotation for small woodlots. These include eucalypt pulpwood, pine and eucalypt sawlog, and mallee oil rotations. Reid and Stephen⁷ provide an example of the design of a simple forest inventory for small woodlots. Schreuder *et al.*⁸ deal with the details of design for larger estates.

The basic information should generally include recording of species, tree diameter overbark at [Breast Height](#) (dbhob), tree height on all or a sample of trees in the plot in order to estimate upper stand height, and bole height in the case of hardwoods.

Most owners of medium and large forest estates have established inventory procedures. The responsibility of the consultant is then to verify the precision and freedom from bias of that inventory, so that a statement of the reliability of the base information regarding Living Trees can be made. Where there are material defects in the reliability, these should be made clear and any further statements in relation to the value of the SGARA should be appropriately qualified.

5.1.4 Inventory precision and bias goals

Accuracy of the inventory should be gauged through estimates of [precision](#) and [bias](#). The appropriate level of accuracy will depend on the client's instructions and the standards prescribed or appropriate for appraisals or independent valuations or audits.

⁶ Details and updates of the Private Forests Tasmania *Farm Forestry Toolbox* are provided on www.privateforests.tas.gov.au.

⁷ Reid, R. and P. Stephen, 2001. *The Farmer's Forest: Multipurpose Forestry for Australian Farmers*. Australian Master Tree Grower, Parkville, 167 pp

⁸ Schreuder, H.T., Gregoire, T.G. and G. B. Wood, 1993. *Sampling Methods for Multiresource Forest Inventory*. J Wiley, New York, 446 pp.

Whether valued from transactions data or by Net Present Value, the volume of Living Trees on the estate is the dominant resource element in determining the magnitude of the value. The volume of Living Trees is a function of the area, size and number of trees. Accuracy of the total volume estimate depends on the precision and bias of the calculated area as well as the forest inventory. Determining an appropriate target error for the forest inventory will depend on the purpose of the valuation, the structure and variability within the forest, and the accuracy of the area calculation. Where yield control is tight and forests intensively managed, the criterion for precision may be stipulated for sub-units of the estate - such as individual logging units, due to their importance in scheduling the future pattern of harvesting geographically, temporally and for particular log assortments.

Material bias for an intensively managed forest or plantation would normally mean a bias (relative to actual) of more than 10%. Although not stated formally, most accounting practitioners tend to minimise the risk of a material discrepancy, such that if they err, it is towards an underestimate, not an overestimate. However, AASB 1037 is careful to point to the undesirability of simply adopting a conservative approach without justifying the reasons for each case. The sampling error may be far higher for sub-populations (eg particular species or a range of size classes) and care should be taken in interpreting such information. Care is also needed in analysing inventories where some plots have zero values for the component of interest as statistical assumptions may be violated.

ACFA recognises that forest inventory and yield forecasting may be complex issues requiring specialised expertise and considerable experience if errors and misinterpretations are not to occur.

5.1.5 Recording sheets: design and retention

The measurements taken on plots vary widely according to local standards and species requirements. **Recording sheets (or hand-held computer templates for data entry and storage) should be well designed and standardised and the data obtained stored in a secure form and place, in case they are needed later, e.g. in legal actions or in discussions with clients.**

A suitable recording sheet for simple inventories may be found in the *Farm Forestry Toolbox*⁹. However, experience of ACFA members in court cases indicates that consultants must not only be able to document the process undertaken, they may be called on to justify it. Hence more complex forms of sampling, such as variable radius plots and centroid and importance sampling need to be well understood if they are to be used.

⁹ Private Forests Tasmania, Farm Forestry Toolbox, www.privateforests.tas.gov.au

5.1.6 Stand history

Details of stand history should be sought and recorded.

Wherever possible, the following characteristics or treatments should be sought and recorded:

- species,
- seed/genetic source,
- year of establishment or regeneration treatment,
- initial stocking,
- fertiliser and weedicide treatments,
- prunings – age, numbers/ha, height,
- thinnings – age, intensity, method,
- insect and disease attacks and treatments, and,
- growth, mortality and removals.

The purpose of recording stand history is to facilitate more precise and less biased estimates of both the current inventory of Living Trees and of the future development of those trees under the scheduled regimes. The extent of the information recorded will therefore normally hinge on the capacity of the forecasting system or yield functions or tables to utilise this information.

5.1.7 Land values

Land values should be established from transactions or otherwise from valuations by the appropriate State agency, consistent with the principle of the best indicator of Net Market Value in an active and liquid market.

Most State Governments provide internet access to land transaction data, and Local Government bodies also often provide valuable resources. These need to be supplemented by field inspection to ensure that differences in location, site productivity, improvements, and condition can be appropriately taken into account.

Normally, land valuations will be carried out by a Certified Practising Valuer who is a member of the Australian Property Institute.

The valuation report should detail the sources of information and the rationale for the value to be adopted in the valuation.

5.1.8 Declare reliance

As with other data, it is important to declare what reliance has been placed on data or information provided by other parties.

5.2 YIELD ESTIMATION

5.2.1 Check growth, mortality, yield functions

A systematic check of growth, mortality and yield functions applicable to the forest or plantation should be carried out and the sources of information used should be recorded.

Some organizations¹⁰ have provided quite detailed systems of yield functions or tables and relevant information for this purpose. The sources of these data and any adjustments or allowances to them need to be recorded in the report.

For larger forest estates, scheduling of wood flows forms a necessary prelude to the estimation of Net Present Value. In these forests, sampling is seldom repeated each year on the same individual block. Rather, sampling of blocks is carried out on a periodic basis using a cycle of three to ten years to cover a large estate.

Older samples therefore need to be updated for growth, mortality, treatment (e.g. later age fertilising) and thinning or clear felling during the intervening period before they can be aggregated with those of the current year to produce estimates of the current volumes of Living Trees. Having brought all predictions in the estate to the current date, future wood flows over time then have to be predicted using the same or appropriately modified functions.

Growth, mortality and yield functions are also needed to forecast future wood flows from the current inventory of Living Trees. Most consultants rely on publications and computer-based models by reputable scientists for these data or functions, adjusting where necessary. They should also satisfy themselves of the scientific basis for any revised functions that incorporate the predicted outcomes of new technologies. This involves professional judgement (and reporting) as to the evidence for such changes and the magnitude of them.

Forecasting wood flows for medium and large estates implies matching the wood flows to the likely market demands. The latter are normally determined firstly from any long-term supply contracts, together with an assessment of regional and general trends in demand. For large estates, scheduling by linear programming, simulation or spreadsheet, is normally carried out to establish the best match between the demands and the capacity of the forest to supply.

¹⁰ e.g. Lewis, N.B., Keeves, A. and Leech, J.W. 1976. *Yield regulation in South Australian Pinus radiata plantations*. Woods and Forests Dept., South Australia, Bulletin 23.
Private Forests Tasmania, Farm Forestry Toolbox, www.privateforests.tas.gov.au,
Borschman, R., 1998. *Plantation productivity potential of blue gum and radiata pine for North East Victoria*. Plantations North-East Inc, Wodonga, 22pp.

6. NET PRESENT VALUE

6.1 EXPENSES

6.1.1 Accrual accounting

[Accrual Accounting](#) is the recommended basis for use in valuation and financial reporting for members of the Association of Consulting Foresters of Australia for all but the simplest and least formal of valuations or appraisals.

The AASB 1001 standard applies to each entity that is required to prepare a general-purpose financial report in accordance with the Corporations Act and requires that accrual accounting be used.

There is a general AAS series of accounting standards that can provide guidance.

6.1.2 Within year timing

Expenses and revenues (in essence cash flows) often occur throughout the financial year, rather than at either end of it. Most valuations based on Net Present Value ignore these differences. In commercial entities with well-developed accounting systems, any issues associated with the timing of expenses or revenues within the year are assumed to be reflected in interest payments by, or earnings to, the entity and are thus represented in either expenses or revenues. Thus both expenses and revenues (cash flows) can be assumed to fall at the end of each accounting period (normally one year) and discounted accordingly.

Where less formal valuations or appraisals are involved, and accounting systems are less well developed, adjustments for the timing of expenses and revenues within any one year are seldom of material consequence in the final valuation. Thus expenses are generally assumed to be incurred at the start of the year and revenues received at the close of the year. Nevertheless, this is an issue that needs to be considered in relation to the materiality (see Section 7) and may warrant change and adjustment in particular circumstances. **The basis used should be disclosed.**

6.1.3 Money or real values

All financial data should be consistent in terms of the treatment of inflation – that is either all ‘money’ or all ‘real’ values. In general, ‘real’ (free from inflation) values are to be preferred because of the difficulty of predicting future inflation.

6.1.4 Guidelines

Expenses should be:

- **complete and current at the date of valuation, and include all expenses associated with the business of wood production or other commercial use of forest, with appropriate allocation of joint costs,**
- **consistent with the forest estate and business activities – if the business is said to be managed according to ‘best practice’ precepts, the capacity**

and experience of staff to do so needs to be checked and attested to,

- **checked against external data wherever possible,**
- **explicit as to the nature of any assumptions as to future cyclical and/or secular trends in real prices or exchange rates,**
- **reliable in the sense of being sufficiently precise and free from bias to avoid misleading readers of the report – and with appropriate reporting of contingencies.**

The expenses to be used in valuation should reflect actual costs in the forest concerned or in comparable operations, either as estimated from cost records, from contract rates in the area, or by professional judgement. **The basis of the estimates should be disclosed.**

6.1.5 Allocating joint costs

Some forests and plantations, especially publicly owned native forests, involve [joint costs](#) in which the cost is attributable to both wood and non-wood goods and services. Common examples include fire protection, and roads constructed or improved both for log haulage during the week and recreation during the weekend. In the former case, for example, a distinction has to be made for the costs of fuel reduction burning around recently regenerated areas, or regeneration or top disposal burns, because these are costs specific to commercial wood production. Where fuel reduction burning is carried out as part of a general strategy to reduce hazards to the forest as a whole, or to neighbouring communities or property, the costs should not generally be borne solely by the wood production entity.

Where joint costs are involved, the general approach is to determine revenue and then match against that the expenses involved in generating that revenue (see AASB : SAC4). Matching is not always easy. If joint costs cannot be allocated on the basis of cause and effect, systematic and rational allocation (e.g. in the case of depreciation) or immediate recognition (e.g. in the case of advertising) may be used¹¹. However, if the other product is a waste or by-product of the process, it may not be not-allocated as a joint cost (see AASB: SAC4).

6.1.6 Check totality of direct and indirect costs

Overhead or indirect costs represent one of the most difficult components to estimate where they are not directly available from the accounting records of the entity concerned. Cost accounting conventions frequently vary widely between organizations, and these conventions are often not made explicit¹². Overhead costs are often under-estimated where

¹¹ Godfrey, J., Hidgson, A., Holes, S. and V. Kam, 1994. *Accounting Theory*. 2nd Ed. J. Wiley, New York., 1994

¹² Forest Review Steering Committee, 1996. *Maximising the Value of the State's South-east Forest*. Department of Premier and Cabinet, S.A., Adelaide.

detailed records are not available to reconcile and check the totality of direct and indirect costs.

Research and development costs pose an issue as to recognition as capital or current operating costs. With few exceptions, such as major capital equipment or works, they are normally expensed as current operating costs because the future revenue flows are spread widely into the future and are uncertain in timing and identification. Once the effect of a new technology (e.g. site preparation, fertilising, weed control or tree breeding) is known, it should be reflected in the growth and yield functions used to predict future yields.

Expenses may include depreciation of capital assets (other than SGARAs) at approved Australian Taxation Office rates. Unless this is done, there will be an inconsistency between the cost of these services that are leased and those that are serviced by the entity's own capital.

6.1.7 Disclosure of contingencies

Contingencies (expenses or revenues) represent potential obligations or benefits that are possible but unlikely, and cannot be estimated with any reliability.

The potential impact of contingencies should be evaluated and disclosed as notes in the valuation report if they could have a material effect on the outcome, even though they cannot be included in the calculating Net Present Value.

6.2 REVENUES

6.2.1 Guidelines

Revenues should be:

- complete and current at the date of valuation, and include all revenues associated with the business of wood production and other commercial use of forest,
- based on the revenues attributable to the living trees – that is, net of harvesting costs,
- checked against external data on stumpage prices for similar log grades and qualities, with due allowance for location and other differences,
- explicit as to the nature of any assumptions as to future cyclical and/or secular trends in real prices or exchange rates,
- reliable in the sense of being sufficiently precise and free from bias to avoid misleading readers of the report – and with appropriate reporting of contingencies.

6.2.2 Revenues net of cost of harvesting

Under AASB 1037, the revenue from the harvest of Non-living Produce (e.g. logs) is deemed to be received immediately after that Produce becomes non-living (see AASB 1037:4.1 (c) and (d)) and must be calculated net of any expense incurred in harvesting.

As noted earlier, for calculating net revenue flows, revenues and expenses are generally assumed to be received and incurred at the end of the year, with interest payments and charges taking up the differences in timing.

In making any comparisons of revenues net of the cost of harvesting between entities, account should also be taken of differences in the extent of exports and the implications of the Goods and Services Tax.

6.2.3 Disclosure of sources of and bases for price estimates

Some near-current prices for logs¹³ are now published and provide a basis for checking the prices received or estimated, given appropriate adjustment for differing conditions such as log haulage distance and log grades.

The prediction of future real prices and revenues is more difficult and uncertain. While current trends in business activity may in some cases enable the current trend of prices in the housing or business cycle to be predicted reasonably precisely, cycles beyond the current become so uncertain as to make cyclic predictions meaningless. Most price forecasts beyond the current

¹³ e.g. *Australian Forest Grower* <http://www.afg.asn.au> ,

AUSNEWZ Forest & Wood Intelligence Service <http://www.ausnewz.com.au/index.html>;

Ministry of Agriculture and Forestry, New Zealand

<http://www.maf.govt.nz/Forestry/statistics/logprices/logprices1.htm>

Tasmanian Market information Update for Farm Forestry. No 1, Jan. 2001.

<http://www.privateforests.tas.gov.au> ; and occasional review publications such as

Margules Poyry Pty Ltd, 1998. *Investment in the Plantation Based Forest Industry in the North East of Victoria*, Australia. Plantations North East Inc, Wodonga.

cycle therefore only reflect the secular trend. Historical trends provide an initial basis for forecasting future secular trends, but these need to be modified in the light of major likely changes in global, domestic or local demand and supply.

The most common method is therefore the hybrid model of forecasting in which prices are predicted for the immediate year or, at most, two years, if possible, based on professional judgement of the trends over those years or so. Beyond that period, real price is generally predicted on the basis of the predicted secular trend, which in turn is based on an analysis of historical trends with due recognition of major shifts expected in demand or supply.

Whatever the basis used for forecasting current and future [log prices](#), sufficient information needs to be disclosed for the reader to understand the general basis used, having due regard for possible commercial confidences. If that basis is changed in subsequent reports, it is essential that the general nature of the change and reasons for it be disclosed.

6.2.4 Non-wood products

Commercial non-wood revenues that accrue to the entity need to be accounted for in exactly the same manner as those for wood, and maintaining the SGARA distinction so that seed, resins and gums etc form a part of the SGARA valuation provided they come from the Living Trees.

6.2.5 Carbon credits

Carbon credits have not yet become established market commodities, and are not yet explicitly recognised in the AASB 1037 standard.

If appropriate then the revenues will not accrue from the extraction of Non-living Produce, but from the accrual of net growth on Living Trees. Thus their inclusion in SGARA valuations of Net Present Value could be similar to that of the complementary accrual of net growth of wood on the value of the Living Trees and preliminary guidelines exist for their estimation¹⁴. Similarly, on extraction of the Non-living Produce through the harvesting of wood, there would be a corresponding decrement in value of the Living Trees due to the harvesting of those trees. The issue is unresolved.

¹⁴ See Australian Greenhouse Office <http://www.greenhouse.gov.au>.

6.3 DISCOUNTING

6.3.1 Guidelines

Cash flows:

- **should use the predicted net cash flows over the specified planning horizon (not less than 50 years in the case of sustainable management projects),**
- **include terminal values for land at the end of the rotation immediately following the conclusion of the planning horizon,**
- **base the terminal values on the forecast values of land at the relevant time or on Faustmann calculations of those values for an optimum regime.**

AASB 1037 is equivocal on the use of pre-tax or after-tax cash flows. Whichever basis is used, the discount rate should be consistent with it. After-tax cash flows have not so far been widely implemented by Australian forestry companies or consultants. General practice is to use a pre-tax basis and argue that the treatment of taxation was unchanged over the two years. It is not yet clear whether this argument can be sustained nor whether auditors will accept it.

Whether the valuation is before or after tax must be very carefully considered and clearly documented.

Depreciation charges are not relevant to SGARA valuation because they are accounted for in the treatment of valuation of Non-Current Assets (AAS4 and AASB 1021). The situation may be different in the case of less-formal valuations and appraisals, depending on the circumstances.

6.3.2 'Money' or 'real' basis

Under AASB 1037, valuations can be conducted either in ['money' dollar values](#) (i.e., dollar values in the year concerned that include the effect of inflation) or 'real' dollar values (i.e. constant purchasing power dollars at some designated base year). Having chosen one or the other, all expenses, revenues and interest rates must be expressed accordingly, and the basis disclosed. A 'real' dollar value analysis does not preclude the incorporation of progressive changes in future real prices and real costs, based on historical trends in the real values.

Where 'money' values are used, costs, prices and interest rates need to be suitably adjusted for inflation in computing the discounted value of future net revenues, often necessitating long term forecasts of inflation. Assuming each valuation is made relative to the end of the financial year concerned, and a constant rate of inflation is used, the outcomes of valuations using real and money values will be the same.

As noted earlier, given the volatility of inflation and the consequent difficulties in making long-term forecasts of it, the use of 'real' values is recommended.

6.3.3 Choice of discount rates

The choice of discount rate has traditionally been one of the most controversial elements in the valuation of forest estates and

plantation estates because of the sensitivity of Net Present Value to the discount rate chosen. The search for one single rate to apply to all valuations is neither appropriate nor sensible.

As noted earlier, for formal financial reporting, AASB 1037:

5.3.2 (d) stipulates that:

A current market-determined interest rate reflecting the risks associated with the asset should be used for discounting.

The opportunity cost of capital is the major conceptual element in the choice of discount rate because it represents a measure of the next best alternative use of the investment funds concerned. The individual entity needs to take account of the following.

- The private market rate that is available. In 2002, Japan had a private market (money) rate of less than 2%, compared with about 5% in Australia.
- The length of the investment period (i.e. rotation). Short horizon investments such as blue gum pulpwood plantations will be geared more directly to private market rates. Very long planning horizon investments in wood production in native forests may warrant lower effective interest rates for far distant revenues and expenses¹⁵.
- The debt to equity ratio. Investors who can avail themselves of substantial debt capital are potentially advantaged because interest charges are allowable expense against revenues, and thus may reduce taxation, unlike equity capital for which dividends are not an allowable expense. As noted earlier, AASB 1037 is equivocal on pre-tax versus after-tax analysis of cash flows, so the choice needs to be carefully considered in this regard and to be consistent in the treatment.
- Risk. Because future debt and equity contributions are not known with any certainty, most discounting is based on a weighted average of the interest rate on debt and the rate for equity – each having a different risk loading. Most practitioners currently use the weighted average [discount rate](#). Alternatively, risk may be taken into account through insurance, or through allowances within the discount rate or through specific stochastic modelling in the prediction of future wood flows, and also in the contracted wood flows. For large forest estates including allowances for risk within the discount rate (as is often done) is less appropriate than stochastic modelling.

Including allowance for risk in the discount rate presumes that risk grows exponentially over time whereas, for a particular species, risk is generally higher at early rotation lengths and reduces thereafter. AASB 1037 only refers to the use of a “current market determined rate”.

- The preference for net income flows over time. Different investors have very different preferences for the time flows

¹⁵ Ferguson, I.S., 1996. *Sustainable Forest Management*. Oxford University Press, Melbourne, 162pp.

of income (and liquidity of investment) in the long run, as the earlier Japanese example highlights.

The important issues for the choice of discount rate in forest valuation are consistency over time and disclosure, such that the readers can adjust the outcome in the light of their own discount rate.

6.3.4 Negative values for some component stands

When calculating the value for each and every stand in a forest estate, negative amounts may result from application of the Net Present Value model for some stands or components of stands. For entities reporting under AASB 1037 or AAS 35 this may have implications for the amounts recognised for general purpose financial reporting purposes.

There are a number of alternative treatments of the negative amounts possible depending on the circumstances.

- A forest stand held primarily for profit may be divided into a number of component stands for harvesting, for example one of higher and one of lower productivity. The calculation of the Net Present Value for the poorer productivity stand may be negative. It may be appropriate to include this negative component value in the overall valuation because it may be that the negative value is caused by the apportionment of expenses on a conceptually inappropriate basis. This is likely to occur if say annual maintenance or roading or other charges are apportioned on the simpler and more readily audited area basis rather than on the more conceptually correct, but practically unmanageable and error prone, actual expense basis. The reasons of the inclusion must be disclosed.
- A spatial region of a forest estate at the limit of suitability for a species may, as a group of stands, have a combined negative value. This may also occur for particular species distributed throughout a region. In these cases two arguments are possible.
 - That part of the forest estate is not being managed primarily for profit in which case the component stands should be subject to an alternative valuation model that takes account of the non-commercial purpose for which the stands are held. The value of that part of the SGARA should be set to zero.
 - That part of the forest estate may not be economically viable but the ultimate owners of the entity, most commonly Government, may have determined that these groups of stands be maintained and managed for other reasons. They therefore provide funding, either actual or

nominal, to cover their management. The value of that part of the SGARA should be set to zero.

- If the value of the total forest estate that is being held primarily for profit is negative, then the value of SGARAs in the forest estate is to be set to zero.

The treatment may depend in part on professional judgement. Whatever treatment is used it should be clearly documented and fully disclosed.

6.3.5 Planning horizon for NPV determination

The SGARA definition is based on Living Trees and these are to be valued separately from non-SGARAs, such as land. This leads to some difficulties when valuing an ongoing forest estate where the land's highest and best use as at the date of valuation is as a forest in perpetuity.

Although the SGARA definition relates to the current Living Trees only, an assessment of their value in an active and liquid market would be expected to include a value attributable to the discounted cash flows from subsequent rotations (in perpetuity). Therefore, the most appropriate valuation for the Net Market Value of the forest estate may be the Net Present Value over an infinite planning period, or over an extended planning horizon with recognition of the terminal value of trees and land at that point in time.

This overcomes the conceptual difficulty in the literal application of the SGARA restriction to one rotation for a typical large forest managed on (say) a 40-year rotation. Restriction to one rotation assumes that the trees to be replanted or regenerated this year have a zero value, whereas they have a value only somewhat less than those that were planted or regenerated last year, that would be valued because they are Living Trees.

In such a case, the basis of valuation of land (and goodwill, if appropriate) must be disclosed. As noted earlier, this basis does not necessarily have to agree with that used to report the value of the land in Non-Current Assets, although consistency is desirable if confusion is to be avoided.

The approach has the further advantage that the forest valuation is completely consistent with the forest planning, assisting planners to gain credibility with owners, managers, boards, accountants and auditors.

The approach is also relevant whether the Corporations Act and AASB 1037 and AAS 35 are appropriate or not. It appears to be consistent with paragraph 5.3.2 of AASB 1037 and also 5.1.10 of AASB 1041 "Revaluation of Non-Current Assets".

6.3.6 Retain all records used for calculating net present value

The algebra and theory of discounting¹⁶ are dealt with in many texts and, more importantly, the algebra is provided in the form of user selected functions, generally under the title of Present Value, in commercial computer-based spreadsheets such as Excel[®].

Much of the laborious work otherwise associated with the calculation of Net Present Value given the proposed schedule of wood flows is now handled by using spreadsheet or more sophisticated programs, even for large forest estates. **(Copies of calculations and all related records and documentation should be retained in the event that a valuation is challenged.)**

6.3.7 Choose appropriate basis for scheduling wood flows

As noted earlier, a clause relating to discount rates (AASB 1037: 5.3.2 (c)) states that the cost of replanting a native forest after harvest should not be charged against the value of the SGARA, because it represents an investment in a future SGARA. This has widely been interpreted as indicating that all valuations of Living Trees should be based solely on the future net revenues from the current rotation, ignoring those that might follow. The stricture may be appropriate when dealing with a forest in which a long rotation is used, because the Net Present Value of the future SGARA is likely to be negligible given a realistic discount rate and a rotation length of 80 years or more.

Where subsequent rotations result in substantive contributions to Net Present Value and, even more so, where the harvest area is of a small proportion of the total estate, in the manner typical of a continuing and sustainable forestry business, this approach does not provide the best indicator of Net Market Value in an active and liquid market. Large forest estates and plantation estates are typically managed to sustain wood flows over time. Scheduling wood flows based on the Living Trees alone for relatively short rotations (say, less than 40 years) results in either a declining wood flow over time, or a much reduced sustained wood flow, because no account is taken of replacement. This can lead to a material reduction in Net Present Value and is not consistent with providing the best indicator of Net Market Value in an active and liquid market for sustainable wood production.

If scheduling is extended to include future rotations, the treatment of terminal values needs to be addressed, if only to check whether they have a material effect. Two alternatives that are broadly equivalent can be used. The first is to employ the initial value of the land, or forecast of its future value at the time in question, as the terminal value. The other is to estimate a terminal value at the end of the rotation immediately following the end of the planning horizon to schedule wood flows, using a Faustmann approach of an infinite series of future rotations for

¹⁶ Davis and Johnson, *op.cit.*, and Brealey et al. *op.cit.*
Pearce, P. H., 1990 *An Introduction to Forest Economics*. University of British Columbia Press, Vancouver, 226 pp.

each stand after clear-felling.

The appropriate choice of planning horizon and terminal values hinges on materiality. Subsequent rotations should be included, or terminal values for them computed and included, when they form part of a continuing and sustainable business activity and may result in a material increase in Net Present Value. The issue of materiality will depend on the magnitude of the Net Present Value of the second and later rotations, which can be readily evaluated.

6.3.8 After-tax basis

Some practitioners have used pre-tax valuations for reporting forest valuations, generally on the basis that taxation is likely to change little from the one year to the next, and thus the increments or decrements in Net Present Value will be accurate. While this may be so at a particular point in time, it is not always so. Moreover, it means that the SGARA valuation shown at the end of each financial year may not be the best indicator of the Net Market Value because an active and liquid market will reflect taxation considerations.

For an ongoing business entity, after tax net revenues are generally not difficult to define. Site preparation, planting, regeneration and tending expenses are currently chargeable against net revenue in the year they were incurred. Periodic changes in Australian Taxation Office treatment of funds raised by prospectus for afforestation highlight the need for checking current rulings¹⁷.

In less-formal valuations (appraisals), before tax valuations may be appropriate. This depends on the use to which the valuation is to be put and the client can always superimpose the appropriate tax considerations.

6.3.9 Sensitivity analysis

Most clients require that appropriate steps be taken to evaluate the financial as well as the biological and physical risks attached to forests and plantations that are the subject of reporting, transactions, or management review. Sensitivity analyses are not required under AASB 1037 but are recommended.

The most common form of evaluation is carried out by sensitivity analysis. This involves testing the sensitivity of the estimated Net Present Value to variations of (say) $\pm 10\%$ in key variables, taken one at a time.

More complex methods involve incorporation of the probability distributions attached to all uncertain variables and then estimating the expected value of Net Present Value by a Monte Carlo simulation approach, using specially developed programs. If such analyses focus on only two or three of the sources of risk, they add little, if anything, to a sensitivity analysis. On the other hand, a fully stochastic analysis is time consuming for large

¹⁷ See Australian Taxation Office website <http://www.ato.gov.au> and Australian Forest Growers website <http://www.afg.asn.au>.

forest estates, may require the prior development of a well-integrated stochastic model, and may be nigh on impossible to carry out.

6.3.8 Reporting change over time

The assumptions and models underlying forest valuation may vary over time as the forest and the systems evolve. Year on year comparisons will normally reflect gradual changes but there may be significant changes that need to be explained.

Sensitivity analysis can be used to prepare forest valuations using alternative assumptions and so facilitate these year on year comparisons. For example, changes to interest rates, silvicultural models, or catastrophic changes to the forest estate, or major improvements to inventory of models, may become material and it is recommended that the new valuation be reported together with sensitivity analyses showing the effect of each of these material changes that have occurred since the last valuation.

The definition of material change will depend on the circumstances but it could be 5-10% of the valuation. This would parallel the tenor of AASB advice on materiality.

7. GENERAL PRINCIPLES

7.1 Check standards for change Standards and guidelines have and will continue to change and improve, partly because of public demands and partly as a result of the increase in knowledge. The best templates to follow for a major valuation may be those of similar recent exercises in the public domain, but these need to be taken as the lowest common denominator. There is always scope to improve on them, if only from the wisdom of hindsight.

7.2 Periodic independent valuations AASB 1037 requires valuation annually, so that the change can be shown in the Profit and Loss account (or 'Statement of Financial Performance' to use the current terminology in AASB 1018, or requirements for 'Interim Financial Reporting' in AASB 1029). While this can be accomplished internally for large forest entities using established processes to estimate Net Present Value, periodic independent valuations are likely to be essential to give credence to those annual valuation changes. Given the uncertainties involved, independent revaluation at three yearly intervals would seem a minimum requirement for large forest or medium plantation estates.

7.3 Guiding principles **The general principles prescribed for financial reporting and set out in AASB: SAC 3 provide useful guidelines for the prospective valuer.**

- **Relevance – to be relevant, financial information must have value in terms of assisting users in making and evaluating decisions about the allocation of resources and in assessing the rendering of accountability by preparers of financial statements.**
- **Reliability - statements should faithfully represent a sufficiently precise (i.e. without undue error) and valid (i.e. without bias) view of transactions and events. The risk of undue error can, in some cases, be offset by prudent disclosure of the uncertainties surrounding the information. Conservatism may be an acceptable synonym for reliability where it relates to the assessment of probabilities and exercise of professional judgement but not simply as arbitrary position against risk.**
- **Materiality – the test of materiality follows the determination of relevance and reliability. It is concerned with testing whether omission, mis-statement or non-disclosure could affect decision-making about the allocation of scarce resources by users of the financial information.**
- **Comparability – the measurement and display of transactions and events need to be carried out in a**

consistent manner throughout the entity and over time for that entity, other than in the case of the introduction of improved accounting standards or new scientific knowledge.

- **Understandability** - statements should be understandable in basic commonsense, legal and accounting terms such as to provide sufficient disclosure for a reasonable person to avoid the potential for misunderstanding.
- **Timeliness** - statements should be available to persons having a reasonable right to them as soon as possible after the end of the period to which they refer.
- **Economy** - the amount of effort and expense in preparing statements should not be disproportionate to the size of the entity and uses to be made of the reports.

7.4 Mandatory financial reporting requirements

SGARAs **must** be presented separately from non-SGARAs in the balance sheet (AASB 1037: 6.1). Furthermore, the following **must** be recognised or disclosed (quoting AASB 1037: 5.4, 5.5, and 7.1):

5.4 Any increments or decrements in the net market value of SGARAs must be recognised as revenues or expenses in the profit and loss account for the financial year in which they increments or decrements occur.

5.5 Any difference between the net market value of non-living produce extracted from SGARAs and the cost of extraction, as at the date of extraction, must be recognised as revenues or expenses in the profit and loss statement for the financial year in which the non-living produce is extracted.

(7.1)(a) the nature of SGARAs and an estimate or relevant indication of their physical quantity, separately classified between “plants” and “animals”, and sub-classified according to the circumstances of the *entity*, showing separately those SGARAs over which the entity has rights that are obtained through leases or similar types of arrangements.

7.1 (b) SGARAs for which the entity’s use or capacity to see is subject to restrictions imposed by regulations or other external requirements that have a significant impact on their total net market value. The total, and restricted amounts of those SGARAs must be disclosed, together with the details and nature of those restrictions.

7.1 (c) if the net market values of SGARAs are based on amounts other than market prices observed in active and liquid markets:

- (i) the method of determining the net market values
- (ii) any significant assumptions made in determining the net market values
- (iii) whether the net market values have been determined in accordance with an *independent valuation* or a *directors' valuation* and, where the net market values have been determined in accordance with an independent valuation, the name(s) of the firm(s) which made the valuation.

7.1 (d) the net amount of revenues and expenses recognised in accordance with paragraph 5.4, showing separately the amount that is attributable to “plants” class, “animals” class, and each sub-class as appropriate to the circumstances of the entity, The method by which the net increment or decrement is determined must be disclosed.

7.1 (e) the net amount of revenues and expenses recognised in accordance with paragraph 5.5, showing separately the amount that is attributable to “plants” class, “animals” class, and each sub-class as appropriate to the circumstances of the entity.

7.5 Importance of disclosure

Finally, where there is uncertainty that calls for professional judgement, disclosure is important, whether it be by way of reference to other published data or predictions as a basis for judgement, or to an explicit recognition of a subjective and perhaps conservative judgement in the interests of reliability.

Disclosure in the public domain may be fraught with difficulties regarding the specifics where commercial-in-confidence data are involved, but the consultant's report can accommodate this through a confidential appendix containing details, and a general description of the matter (and appendix) in the main text.

8. REVIEW OF STANDARD

- 8.1 Review and maintenance of the standard ACFA have established a subcommittee charged with the ongoing enhancement and maintenance of this standard.
- The sub-committee will comprise the President of ACFA as Chairman, a Coordinator, and three members.
- The procedure for adopting any changes will be as follows.
- The sub-committee will discuss and agree on proposed changes, consulting as widely as they deem appropriate.
 - The proposed changes will be forwarded to the Executive Committee of ACFA and any interested parties for further discussion and comment.
 - If necessary the sub-committee will modify the proposed changes.
 - These proposed changes will be circulated to all ACFA members for comment unless they are minor editorial or formatting changes.
 - Comments will be considered, but under the constitution of ACFA it is the Executive Committee which has the responsibility of approving any changes. If the changes are considered by the Executive Committee to be of such moment or importance then the Executive Committee may deem it appropriate that the proposed changes be put to a General Meeting of ACFA.
- When the Executive Committee has approved the proposed changes that version will be placed on the web site and all members will be informed of its replacement by the President or Business Manager.

DEFINITIONS AND EXPLANATIONS

SGARA

A SGARA (self-generating and regenerating asset) is a non-human living asset and is intended to apply to all living assets, regardless of the production cycle, or how they were created. Produce from a SGARA that continues to undergo change after extraction form a SGARA (e.g. wine) is not a SGARA because it does not undergo biological change¹⁸.

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Living Trees

Living trees are those that are biologically alive, whether standing, prostrate, or with broken boles. This is a new term to replace the traditional 'standing crop' or 'standing trees' whose meanings no longer conform precisely to the SGARA definition.

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Non-living Produce

Non-living produce represents the potentially commercially saleable produce derived from a SGARA but is not a SGARA itself because it is not living. In the case of forests this includes, logs, pulpwood, firewood, turpentine, ungerminated seed, severed foliage and floral parts.

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Non-current Asset

A Non-current Asset is a future economic benefit controlled by the entity as a result of past transactions or other past events which, in the ordinary course of business, would not be consumed or converted into cash, or would be due or payable, within twelve months of the end of the financial year to which the financial report relates or reporting date involved. A SGARA may be a class of non-current asset.

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Net Present Value

The Net Present Value of a forest or plantation is the aggregate value of the future stream of expected net revenues, when appropriately discounted to the end of the financial year concerned or other stipulated reporting date. For forest valuations, the stream of future net revenues is normally extended to infinity (the Faustmann¹⁹ approach) or to a particular point in time such as the end of the first or second rotation and a terminal value attributed to the land and forest at that point.

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¹⁸ Parker, C. (ed.), 2001. *Accounting Handbook 2001*. Volume 1. Prentice Hall, Sydney, 1453 pp. See AASB 1037: 10.1

¹⁹ Faustmann, M., 1995 [1849]. On the determination of the value which forest land and immature stands pose for forestry. Trans. W. Linnard), *Journal of Forest Economics*, **1**(1). 7-44.

'Money' and 'Real' Values

Money dollar values (m_t) in year t can be converted to real dollar values (r_t) in year t by multiplying it by the ratio of the price index in the base year (P_b) to the price index in year t (P_t) (or the inverse expression for real to money values):

$$r_t = m_t (P_b/P_t)$$

Suitable series for the Australian Consumer Price index may be found in <http://www.abs.gov.au/austats/>

If all rates are expressed as decimals, real rates of interest or discount rates (i_r) can be calculated from money rates of interest or discount rates (i_m) by adjusting for the rate of inflation (i_i) as follows:

$$(1 + i_r) = (1 + i_m) / (1 + i_i)$$

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GPS Measurements

Global Positioning Systems (GPS) now represent the recommended method of measurement of land and forest boundaries because of speed of use and accuracy.

Many explanations on good practice using GPS are available, including the *property and titles* section of the website <http://www.nre.vic.gov.au/>.

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Forest Inventory

Forest inventories differ from most other inventories because

1. The products (logs in a living tree) and the processing plant (the living tree) are virtually indistinguishable.
2. The capacity of the processing plant (the future rates of production of various log classes) varies according to the present rate of production (rates at which log volumes are harvested). A forest or plantation estate that is heavily cut may suffer a marked reduction in future growth. One lightly cut may produce an increase in future growth. This inter-relationship between harvest and future growth is especially troublesome, given the inability to distinguish between processing plant and product.
3. The processing plant is very variable in constitution and may be spread over thousands of hectares. Even-aged forest stands and plantations arise from regeneration or planting in the same year. A forest or plantation estate may contain age classes from zero to perhaps 50 years, or much more in the case of native forest. Each age class is mostly independent of its neighbours except for the influence of exogenous factors such as fire, disease or the economies of treatment. In uneven-aged forest, trees of vastly differing ages and size exist on the one area of land and competition between neighbours may be intense. The processing plant may be variable due to variation in soils, and hence site productivity, or due to local hazards such as lightning strikes or hail.
5. Differences in silvicultural or harvesting practices can lead to differences in the log yields or qualities of particular sizes from otherwise identical stands. Genetically and environmentally-caused variations in tree form may be such that trees of the same dimensions at the base yield different volumes of particular log sizes or qualities.

6. Many different products in terms of log sizes and/or qualities are produced from large commercial plantations. As many as twenty may be separated either in the forest or in the input line of the processing facility. Markets for these products can change markedly over extended periods of time, some disappearing and new ones emerging.

Such product variability on a spatial and temporal basis demands the use of demonstrably objective estimation of the volumes of living trees. However, this would present a prohibitively expensive task if each tree had to be measured and hence the use of objective sampling.

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Precision

Precision refers the dispersion of measured or estimated values around the true mean under repeated sampling. In forest inventory, it is generally measured by the sampling error at the 95% probability level.

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Sampling Error

The sampling error is the standard error (i.e. the square root of the sample variance around its mean) times the value of the Student 't' statistic at the given probability level.

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Bias

Bias refers to the difference between the estimated sample mean (i.e. the Expected Value of the sample) and the true value of the statistic under review.

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Breast Height

Breast height is defined as 1.3m above ground level on the high side of the tree in Australia (1.4m in New Zealand).

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Accrual Accounting

Accrual accounting involves recognition of revenues and expenses (and assets, liabilities and equity) in the financial year in which they occur, irrespective of when cash has been received or paid.

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Joint Costs

Where the costs of supply of a particular good are not independent of the supply of other goods and services²⁰, substantial economies may accrue such that the aggregate cost across all uses is substantially less than the sum from supplying those uses individually and separately. Land is an example of a major and critical input that is used in the production of all of the multiple uses of forests. This means that if the same quantities of the various uses were to be supplied independently from separate areas of land, the aggregate cost is likely to be well in excess of that from multiple uses. Wood and non-wood uses alike will be more economic under such an allocation than they would have under single use management. The spreading of costs is of benefit to all uses concerned, since it makes all more economic and thus justifies more investment in all. As is well known, there are countervailing propensities in relation to the provision of public consumption goods from forests, of which conservation and some aspects of recreation are examples, which lead to under-investment in these non-commercial services.

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Log Prices

One of the most vexing issues in valuation is the basis for predicting what prices will hold for wood in the future. Most analyses will have a planning horizon of at least 30 and generally of 50 years or more. There are therefore two characteristics to be determined - the immediate levels of real prices based on the current business cycle, and the secular trend, if any.

The Forestry Commission of Great Britain²¹ at one time applied the prices pertaining to the current year to the entire forecast period. This rendered the balance sheet liable to major and erratic changes from year to year and hence is no longer used.

A moving average of past real prices over an entire business cycle in pulp and paper or sawn timber can be used to dampen such fluctuations by using the moving average value for the current year, in place of the current price. However, it would have to embrace 3 to 7 years and the secular trend component within that time may then be substantial.

Carrying the predictions from such a moving average or cyclical model forward and applying them to future prices is not recommended in view of the notable imprecision of these models.

Most practitioners first establish a set of real prices that reflect a secular average rather than spot level for the initial year or two and then apply a simple secular trend function to it to predict future prices.

The choice of immediate real prices and price trends are matters of professional judgement, not accounting standards. There is no universally correct method of predicting prices or the entrepreneur discovering it would have taken over the world of business long ago. It is up to the client, reader or auditor to determine whether the approach taken represents a reasonable assumption, under the circumstances. For this reason, disclosure of the methods used to predict future prices is essential.

The fact that the outcomes of the successive valuations of SGARAs shows up directly in the profit and loss account provides a strong incentive to be unbiased and as precise as possible, especially in the immediate future, if unwelcome surprises in successive valuations are to be avoided.

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²⁰ Hof, J.G., Lee, R.D., Dyer, A.A. and B.M. Kent, 1985. An analysis of joint costs in a managed forest ecosystem. *Journal of Environmental Economics and Management* 12:238-52.

²¹ Ferguson, I.S. and K. Houghton, 1996. *Valuation of Forest Assets*. Special Audit Report, Auditor-General, South Australia, Adelaide, 45 pp.

Discount Rates

In the simple Capital Asset Pricing model²², the discount rate for equity capital (R_{CAPM}) is calculated as follows:

$$R_{CAPM} = R_f + \beta [E(R_m) - R_f]$$

where

R_{CAPM} denotes	the opportunity cost of capital
R_f denotes	the risk free rate of return
β denotes	the systematic risk of the equity
$E(R_m)$ denotes	the expected rate of return on the overall market portfolio

The risk free rate of return is generally measured from the 10-year United States Treasury bond rate (because it is accepted as the most stable rate), which has generally been in the range 4 to 5% in the last decade. All rates cited here are in money values.

The values of β vary for different industries and major entities²³, from about 0.3 to 2.0. Those for major forest products companies are generally in the range 0.7 to 1.3.

The risk premium $[E(R_m) - R_f]$ was generally in the range 3.5 to 5.0% for the decade to 2000.

Thus the opportunity cost of capital in money terms for major forest product firms lies anywhere between 6.5 and 11.5%.

Inflation has recently been in the vicinity of 3% in Australia. Hence, the real values of the opportunity cost of capital used by major forestry investors are generally in the realm 7 to 9%.

There are alternative, more complicated formulae that may be more appropriate than the one above, or may be mandated for use in certain circumstances. It is important that whatever methodology is used it must be clearly documented.

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Independent Valuation

An independent valuation is defined as a valuation made by a firm which is an expert in relation to valuations of that type of asset and whose pecuniary or other interests could not be regarded as affecting the firm's ability to give an unbiased valuation.

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Director's Valuation

A directors' valuation is a valuation which is not an independent valuation (AASB 1037: 10).

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²² Brealey, R., Myers, S., Partington, G. and D Robinson, 2000. Principles of Corporate Finance. McGraw-Hill, Sydney, 1122 pp.

²³ McKinsey & Co, Inc., Copeland, T., Koller, T., and J. Murrin, 2000. *Measuring and Managing the Value of Companies*. J Wiley, New York, 493 pp.