

# **Private Native Forest Productivity, is it the Key to the Future of Queensland's Timber Industry?**

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## **Abstract**

In SE Queensland the RFA process effectively halved the State Forest production area in south East Queensland and guaranteed a 50,000 m<sup>3</sup>/annum harvest from the remaining area until 2024, a reduction of 43,000 m<sup>3</sup>/annum from the previous decades average harvest. The future of the state's contribution to hardwood timber production has been shifted to plantation production after this date and the state has funded the establishment of 5,000ha of hardwood plantation in SEQ for sawlog production. \$10M has been allocated to sections of the processing industry for plant and equipment technology upgrading. To date however, there has been no state allocation of funds for assessment or productivity enhancement of the private native forest resource, despite this resource supplying more than half the state's annual native forest harvest.

Plantation development of non-domesticated species is a high-risk venture and current knowledge of the likely wood quality or quantity produced in the nominated 25-year rotation length is scarce. Private native forest resource will act as an alternative resource, particularly in the early transitional stages of this fledgling industry. With good silvicultural management strategies the private resource is more than capable of supplying the required volumes.

Current trends however are indicating that there is a reduced volume available from the private resource. Recent strong demands for timber to feed the current building boom has not resulted in greater volumes harvested from private lands despite many landholders selling timber ahead of the Vegetation Management Act.

Declining productivity of private native forests may be due to a number of reasons. While land clearing and resource loss is a major factor, the lack of good silvicultural management is evident in many private native forests. High percentages of the standing timber is either suppressed or damaged from past logging operations, causing a progressive decline in the productivity and value of this resource.

This paper discusses the history of PNF management, their current condition and the processes, both physical management and those involving information exchange, needed to bring these forests back into productivity. It also discusses the impacts of removing private native forests out of the timber production equation and the naive notion of replacing it solely with plantation grown hardwoods.

## Introduction

Generally, land selection in Queensland followed in the tracks of timber cutters who moved through virgin forests in a 'highgrading' operation, harvesting only high quality trees where these were accessible. Early settlers following on often had a poor understanding of the land generally, at times making inappropriate selections for farming. Once established they set about harvesting and ringbarking to clear for pasture production, often interrupting the natural cycle of frequent fire. In many areas agricultural productivity was low and many were abandoned and left to regrowth. The soldier settlement block allocation system following WWI is an example of this. Where this occurred, invading regrowth often resulted in heavily overstocked stands of largely unmerchantable timber.

In the early 1900's, with the vision of our forefathers for an assured future timber resource, tracks of land were set-aside as state forests and forest management commenced. Early forest managers were faced with the problems of very low productivity from forests that had once been 'old growth' forests and now were developing regrowth forests. The negative effects of overstocking, particularly with unmerchantable and non-commercial species, soon became apparent and as early as 1919 silvicultural treatment started. This peaked in the late 30's when up to 25,000 ha/yr were treated, peaked again in the late 40's with 20,000ha/yr and again surged in the 60's with the introduction of phenoxy herbicides (*Anderson,1982*). While early treatment rules were relatively conservative, as results from silvicultural trials became apparent these were incorporated into management and by the 1940 – 50s guiding principles included:

1. The removal of useless stems from the stand,
2. Selection of the retained stand based on potential, and
3. Thinning of the remainder of the stand where necessary.

For the most part, however, silvicultural treatment was limited to state land and information on silvicultural techniques developed for state lands were not made available to private landowners. An 'allocation' and set pricing system was also devised for timber sales from state land, thus effectively setting a ceiling price for all native forest timber irrespective of tenure.

By the mid to late 1970s, economic rationalism started to intervene and native forest management became less popular and forest managers were forced to rely on harvesting alone for silvicultural management of native forest. Most recently in many parts of Australia, Regional Forest Agreements have been established guaranteeing supply however a variation in SEQ has included a sunset clause for native forest on state land, thus ending the vision our forefathers had of state land specifically set aside for timber production in perpetuity.

### *Private Native Forests (PNF)*

In Queensland the private native forest has long had an essential role in providing a percentage of the total harvested timber resource. Sawmills have become reliant on the private resource to maintain an economic throughput or in many cases have been solely reliant on private forest for all their resource.

Private native forests currently form a very diverse and heterogeneous resource. In general, this has been the result from varied approaches to management where opportunistic harvesting, and not good forest management has dictated silviculture. In many cases this has been through a lack of knowledge of basic forest processes. In Queensland particularly, the uneven age and mixed species nature of PNF has contributed to this. As a consequence, productivity has generally declined well below potential, resulting in higher proportions of unmerchantable and non-commercial trees following successive harvests. Significantly however, the private native forest resource is an essential component of the timber industry and will be required to continue to supply at approximately current levels.

In the Burnett-Mary region there are in excess of 50 hardwood sawmills. Approximately half of these mills are dependant on the private resource for their timber and the other half rely on the state allocation system from crown land for most timber. Over recent years the private hardwood harvest has dropped from 353,000 to 204,000 m<sup>3</sup>/year (DPI and is continuing to decline at approximately 7% /annum. In the event this continues over the next decade, it is feasible that up to 20 of the existing sawmills will close due to lack of supply.

As well, this may effectively decrease the market by increasing potential haul distances placing downward pressure on current stumpage prices. Lower returns in turn may lead to alternative land uses such as clearing for pasture production.

The Burnett-Mary region in SE Queensland has in excess of 500,000 ha (approx) of private native forest suitable for timber production. Increasing the productivity of half this area by 1 m<sup>3</sup>/ha/yea (at present due to poor management merchantable productivity is estimated to be as little as .2 m<sup>3</sup>/ha/year), would result in an extra 250,000 m<sup>3</sup>/year being available for harvest. This is equivalent to 15 million dollars (current prices) extra to the landholders alone without considering the flow-on effects of the processing and associated industries.

### *Hardwood Plantations*

Plantation development is a high-risk venture, particularly when implementing a 5,000ha establishment program without the research results to allow reasonable models to predict the factors of rotation length, species, soil type, rainfall zones and pathogen interaction. These factors could strongly influence the outcomes achieved under this program, namely:

1. The majority of the plantings are made up of two species; one prone to severe pathogen attack and the other largely planted off site with very unpredictable growth and timber quality results. The loss of the range of species now harvested out of PNF and their unique attributes of colour, strength and durability limits the marketing advantage only recently achieved in the foreign marketplace.
2. No Australian hardwood plantations to date have produced satisfactory saw logs in 25 years while achieving an economic return to the investor.
3. If the growers do not achieve an economic return they will not participate in plantation timber production in the future
4. Forecast final harvest volumes need adjusting for innate production problems and risk calculation (conservatively) factoring in a 10% failure rate and at least 10% below forecast growth predictions
5. The compulsory 25year rotation may produce a grossly inefficient result if the product is removed before optimum size is reached.
6. If this area of plantation realistically replaced the volumes harvested from the state forests in the RFA area in 98/99 then it would last only 8 years
7. Risk factors such as drought and fire (particularly in the first 5 years) and cyclones and insect attack (stem borers) over the life of the plantation must also be considered when concentrating the majority of production in a relatively small region.

Plantation hardwood can be an important part of future hardwood production, but for critical mass of the industry and for risk management ensuring alternatives in the event of production failures, private native forests are essential for industry security. In this regard the importance of the role of PNF has been underestimated in the current scenario in Queensland and the following points need to be considered:

1. PNF is a significant resource to the processing industry and remains critical to continue with current levels of industry productivity.
2. Current estimates are that it is producing well below potential productivity.
3. Predicted outputs from the hardwood plantation resource will only ensure 'status quo' in terms of supply and fail to take into account future growth and risk management issues.

### **Defining the Problems with Private Native Forest Management**

The majority of private native forests in SEQ are derived from regrowth of previously cleared land or to a lesser extent conversion of previous mature forests by repeated harvesting into a regrowth stand. Extensive early clearing, changes in fire regimes and poor management has combined to produce a variable resource. Eucalypt forests are resilient however, and are capable of profuse regeneration. Results from a three-year extension project in southeast Queensland have clearly identified a number of 'forest conditions' commonly found in PNF.

The majority of these forests can be divided into four categories:

1. Young re-growth stands on:
  - (a) Previous grazing country no longer maintained and the lignotuberous regrowth have developed into an even-aged forest or
  - (b) A stand originating from seedlings spreading away from an established forest.



**Figure 1. Young Spotted Gum regrowth thinned from 600stems/ha to 200 stems/ha.**

Typically these forests have an average diameter of less than 20cm, with stocking rates of 600+ stems/ha.

This type of regrowth is becoming increasingly common and responds very well to thinning as long as they are not left till the whole stand is locked up and suppressed. Thinning is predominantly done to waste by injection at a cost of less than \$200 /ha or if made up of durability 1 species, sale of fencing materials often results in a cost positive operation.

2. A regrowth forest left unmanaged and now heavily overstocked with:
  - An overstorey or dominant layer of trees that have grown faster and are now in a dominant or co-dominant position. These trees are now growing slowly due to heavy competition from below. A proportion of these trees are usually in decline due to excess competition, insect attack, fungal attack or crown dieback.
  - An understorey or intermediate layer mostly of suppressed and/or non-merchantable trees with little potential for growth even if released.
  - A ground or regeneration layer often occupied by invasive Brush Box species and very suppressed eucalypts of poor form.



**Figure 2. Overstocked Spotted Gum regrowth forest**

3. A regrowth forest left unmanaged except for periodic 'high grade' harvests often with:
- Significant levels of damaged trees from the previous harvest operation.
  - High proportions of the residual stand defective or suppressed.
  - Large quantities of harvest residues pushed into heaps often against good young trees.
  - Degraded tracks and log dumps due to poor location and no post harvest drainage.
  - Some good quality trees in the 20 - 30 cm DBH range.
  - Areas of heavy regeneration.
4. The fourth category is a well-managed forest often incorporating good forest management and grazing. This form is very much in the minority.

**Figure 3. A well-managed Spotted Gum stand incorporating well spaced trees and grazing.**

**Photo taken soon after completion of post-harvesting maintenance**



### **Facilitating Change**

Influencing change in an industry with 100 years of entrenched practices requires a two-pronged strategic approach.

1. Completion of a comprehensive resource assessment to understand forest type distribution, condition, owner's intent and the processes required to bring the resource into a productive condition.
2. The instigation of a capacity building program targeted at a range of industry, contractors, landholders, the conservation lobby and natural resource managers. Capacity building needs to clearly demonstrate the on-ground management processes and their costs and benefits in the full range of forest types and condition identified in the resource assessment. This process needs to be specifically targeted to each group.

### *Processors and Contractors*

To date the processors and contractors have dictated harvesting terms to landholders. In the past they have had an abundance of resource and generally their focus has solely been on its exploitation.

*" our business is based on value-adding, using only the best of the resource, and is built on critical mass. A reduction in mass and quality will mean a scaling down of our business."* James Neville Smith, Victoria's biggest hardwood timber mill, *The Age* (Melbourne), /2002.

To date, industry has not demonstrated a consistent, responsible approach to management of private native forest. Two standards have applied in the industry, one where a competent and responsible approach has been taken in the regulated harvesting of the crown resource, and a lower standard on private land where harvest is often associated with 'high-grading', poorly classified and accounted product, damaged residual stand and poor environmental outcomes. A potential solution to this is a comprehensive education program for contractors and certification covering compliance to management and OH&S competency standards.

### *Landholders*

During the 3 years of this project the major dissatisfaction expressed by landholders has been the poor returns received from timber harvesting, the quantities of waste left in the bush and the condition of the residual stand. Unlike other forms of primary production, timber has an extended cycle of production and traditionally the specific skills and knowledge needed for effective forest management has been available only to those who have worked in the industry. To ensure long-term viability, maximum productivity and returns, farm managers need to be aware of best management practices, the range and value of the products in their forests and how to obtain the best returns. To achieve this a comprehensive program demonstrating actual NFM processes, with hands-on adult education technique, building capacity and skill levels directly applicable to forest management on their farms has to be implemented.

### *3. The Conservation Lobby and Public Perception*

The conservation lobby in Queensland has run a very effective anti-logging campaign based on exaggeration, and poor understanding of forest dynamics or good forest management principles. They have constantly portrayed timber harvesting in Queensland as clear-fall operations, using photos from Tasmania or Victoria and never acknowledging the single-tree selection system used here. Paradoxically they describe areas of State Forest that have been managed for 80+ years, harvested three times and treated twice as pristine old-growth forest. In the absence of any credible counter argument from the state they are convincing the public of their case. The reality of sustainably managed forest producing timber, habitat, biodiversity and other values is very different.

## **Implementation of a Program for Change**

While successive State Governments in Queensland have not directly addressed the issues of PNF by funding extension programs for private native forest management, other groups have applied for and gained recent Natural Heritage Trust funds for an extension project in environmentally sustainable forest management. The Mary Valley Sunshine Coast Farm Forestry Association was successful in a joint venture with the Queensland Forestry Research Institute.

The advantage of combining a forestry research institute and community-based farm forestry organisation enabled the project steering committee to be made up of a multidisciplinary team of scientists, industry, landholder and environmental groups representatives and various natural resource managers. Each member could focus on familiar components of designated problems and their possible solutions and the project officer could pull all these strands together into a coherent, focused program.

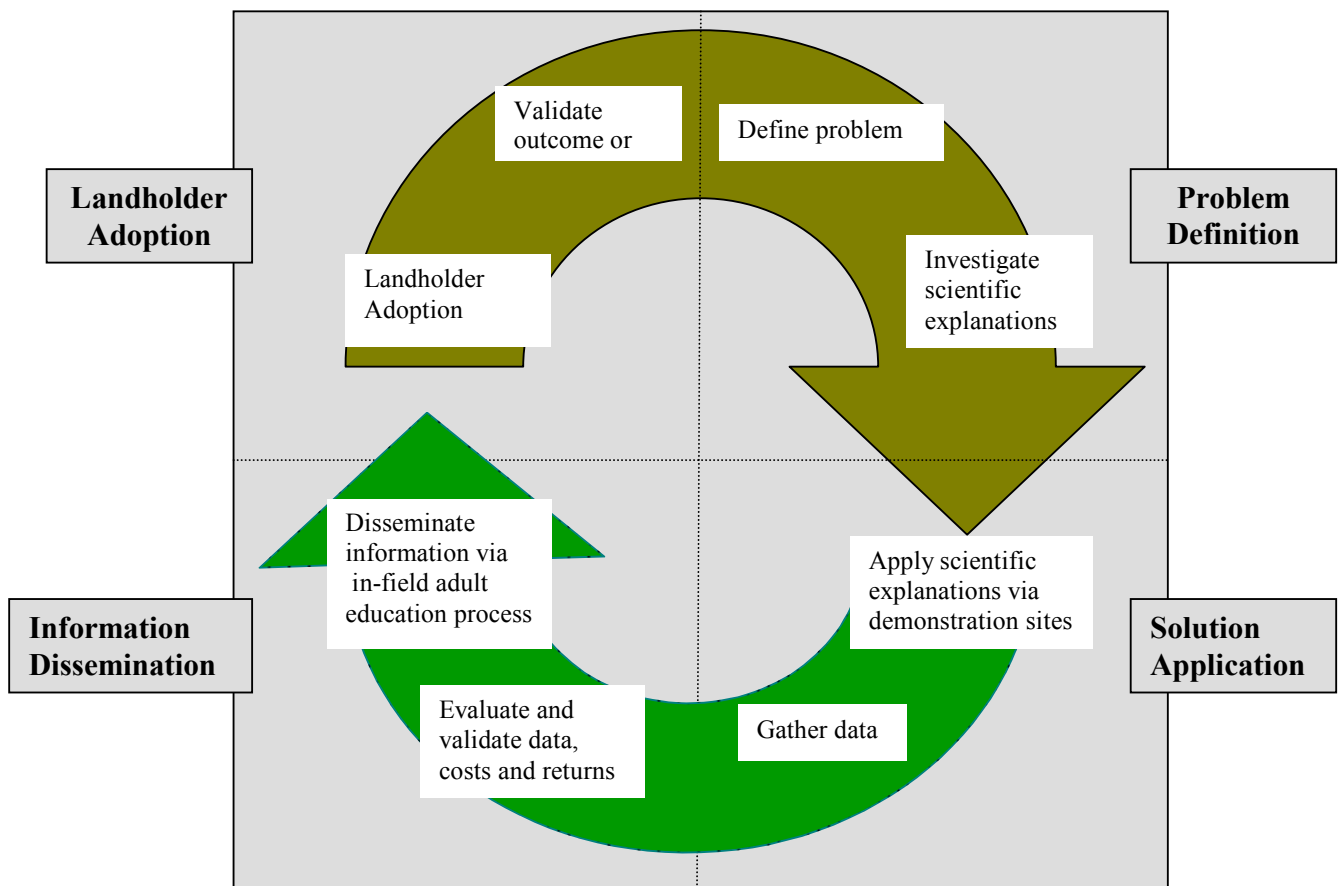
The project initially based in the Mary River Catchment, is now seen as a pilot for SE Queensland.

The overall project strategy has been to:

1. Map and stratify the private native forests of the project area to determine extent of the resource.
2. Locate suitable sites within the selected areas for establishment of demonstration sites based on location, forest type and forest condition.
3. Illustrate stand management and environmental protection principles. Within these demonstration sites, a range of silvicultural practices, habitat management, fire management and where appropriate, timber harvesting techniques based on the 'Code of Practice for Native Forest Timber Harvesting' has been demonstrated.
4. Implement a comprehensive knowledge and capacity building program based on demonstrating actual NFM processes, using hands-on adult education techniques directly applicable to forest management on their farm.

The project considered it imperative to base its extension program on information based on direct scientific investigation and amelioration of productivity problems apparent in many private native forests. Implementing a program based on a variation of 'Action Learning' and 'The Principles of Applied Science Inquiry' (Bawden *et al* 1985, Bawden & Packham *nd*, Wilson & Morren 1990) was considered most likely to succeed.

**Figure 4.** Represents the phases in this process (*adapted from Wilson & Morren 1990*).



### Extension Program

The major focus of this project is to use demonstration sites to illustrate and disseminate solutions to a complex mix of inherent and stereotypical problems occurring in private native forests. The demonstration sites are located in a variety of forest types subjected to a range of past management and involves implementing the management procedures considered necessary to either ameliorate problems developed due to poor past management practices or implement the next step in the stand cycle for well managed stands. To date these include:

1. **Thinning an overstocked timber stand;** Investigating the growth response in a mixed hardwood forest subjected to two silvicultural thinning regimes with high retention standards compared to that achieved in the untreated forest (control plots). The thinnings were marketed and the costs and returns calculated for each procedure and probable value of each of the residual stands.
2. **Rehabilitating a 'high graded' forest;** This site looked at two areas on a property carrying predominantly Spotted Gum, one with a residual stand suitable for treatment

(commercial and non commercial thinning) and the other with very heavy regeneration, but little residual stand most of which was defective and needed removing. A variety of spacing regimes were again applied to the first area removing the defective and suppressed sector of the stand and retaining 80, 100 and 200 stems/ha respectively comparing costs, returns, future growth rates and product ranges against control areas. The second site supported heavy regeneration (3000/ha, 4-6m tall) and was thinned to 600/ha using a variety of techniques and equipment including fire as a comparative study on costs, techniques and effectiveness.

3. **Implementing an integrated sale;** Product left in the bush is one of the areas most landholders are dissatisfied with in the harvesting process. Implementing a 450m<sup>3</sup> harvest and then marketing a full range of products to a range of buyers demonstrated a fully integrated sale process from tree marking to product sorting, specifications, presentation and marketing. It detailed costs, real product values, marketing techniques, environmental considerations and post harvest maintenance including regeneration procedures.
4. **On farm value adding;** Value adding is frequently cited as a panacea to the poor returns often received by the grower. The aim of this trial was not to advocate value adding, but to test one form of the process from stand management to harvest, value adding and sales. It examined the systems used and included a cost comparative analysis of the returns from value adding a portion of the 230 m<sup>3</sup> harvest against the returns from the rest of the harvest sold straight to a mill.
5. **Thinning for Grazing and Timber Production;** Vast areas of Queensland's private forests are used for grazing as their primary land use. Opportunistic timber harvesting is also carried out over most of these areas with little or no management consideration to improving stand productivity. The management options generally considered are how can I improve my grazing capacity, is it best to pull it or Tordon® it? This trial follows the process of implementing a range of thinning options in a medium quality Narrow-leafed Red Ironbark (predominant height 23.0m), the native grass species present and the growth response achieved on the granite soils north of Crow's Nest in SEQ

At each site a detailed stand assessment is carried out with the landholder, ascertaining stocking rates, size class range, product type and length and the standing volume including an investigation of the past stand management, and how this combined data affects the decision-making processes for the future of the stand. Each site then follows a set procedure:

1. The first field day is held to consider the stand before actual work commences but with the detailed stand data available. Stand problems are considered and solutions discussed.
2. The management process considered best for the stand is then implemented.

3. A subsequent field day on the site is held to look at the actual techniques involved in the processes, product specifications, any problems encountered and detailing a break down of costs, returns and future outcomes for the stand.

**Figure 5. Discussing specifications for sawlogs and girders**



A series of 5 field days are then held, to cover SNFM in detail, each at a different property to give experience in a variety of stand conditions and species mix. Permanent growth plots are established at each site for future and as a reference for the farmers. The trees are tagged and numbered and relevant data collected including dbh, tree height, crown health score and product range. Separate regeneration plots are also established. Re-measures of these plots are taken annually over the project life and the data entered into the QFRI database for analysis and future reference.

Each demonstration site is then written up in a detailed case study outlining all the above procedures, techniques, costs and returns. These are then available as a reference for future work.

## **Conclusion**

Replacing native forest production with plantation timbers is not the panacea to all issues raised by the conservation lobby. Plantation development and its subsequent management and harvest processes are costly in monetary, resource consumption and environmental impacts and do not fully recognise the role of private native forest. In the initial 25-year rotation it must not be seen as guaranteed resource security for the timber industry and the importance of a parallel supply from PNF will provide industry with resource security.

Private native forest production is low cost with a broad range of environmental outcomes. It has a low risk of outright failure due to its uneven age status, broad species and size class mix and widespread distribution. At present it has productivity problems due to poor management over a prolonged period. This has been aggravated by a processing industry largely disconnected from and apathetic to good forest management principles.

For change to occur a mind set change has to occur across industry, contractors and landholders. Landholders generally have very low levels of understanding of good forest

management but have shown great interest when given the opportunity to raise their skill capacity. Many can see the potential advantages of better production and the likelihood of potentially better returns from a reduced supply of hardwood.

Combining demonstration sites with in-field adult education processes has proved a very successful approach to imparting information and skills to landholders. Generally landholders learn visually, they want to see the process in the field and even more importantly they want to see that the person advocating these systems can put into practice what they preach and not just eulogising theory. The high level of interest and repeat attendance by landholders at field days has demonstrated the increased profile of incorporating forestry into other agricultural activities.

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