



Performance Evaluation of the Tasmanian Community Forest Agreement Intensive Forest Management Programme

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Performance evaluation of the TCFA IFM programme

1 Executive Summary

Plantall Forestry Consultants were engaged by the Tasmanian Department of Infrastructure, Energy and Resources to conduct a performance evaluation of the Tasmanian Community Forest Agreement Intensive Forest Management Programme.

The programme introduced in 2005 aimed to mitigate the impact of new forest reserves and reduced clearfelling techniques by supporting existing plantation productivity improvements, development of new plantations and enhanced native forest thinning programmes. \$115 million was allocated by the Tasmanian and Australian Governments in the period 2005 . 2010 to establish approximately 14,000 hectares of new plantation, prune and secondary fertilise 10,000 hectares of existing plantation and to thin a variable area of native forest regrowth all to be managed towards the production of high quality sawlog and veneer logs. The Integrated Forest Strategy (Forestry Tasmania, 2005) identified a target of supplying 115,000 m³ of high quality sawlog each year from plantations from 2022. The sustainable yield of high quality sawlog from plantations was projected in 2007 to be over 150,000 m³ per year (Forestry Tasmania, 2007). The Intensive Forest Management programme has been delivered by Forestry Tasmania and is ongoing.

The evaluation reviewed the Integrated Management System operated by Forestry Tasmania, analysed a dataset extracted from Forestry Tasmania's Forest Operation Database which covered the IFM programme and conducted field inspections of 354 coupes selected without bias which represented 12,300 hectares of forest operations. Secondary fertiliser operations were verified from office records only because field evidence of fertiliser disappears within weeks of application. Operations and records reviewed were categorised as compliant, opportunity for improvement, area of concern or non-compliant.

The Forest Operation Database (FOD) is a suitable facility to record the activities and operations for preparation of the TCFA IFM Annual Acquittals.

The Forest Operations Database did not identify specifically which operations had made up each annual acquittal of the TCFA IFM programme. This made the audit of acquittals difficult.

Recommendation 1: That Forestry Tasmania develops ways to tag each operation comprising the Annual Acquittals of TCFA.

New Plantations under the IFM programme were generally well established. The total area of New Plantation established under TCFA IFM was 13,455 hectares and 102% of the total of Annual Acquittals. There was limited correspondence between each annual acquittal and the FOD area planted in that year. Joint ventures with other investors were involved in 30% of the area established. Of the establishment coupes reviewed, 89% by area was compliant with good practices. The 3% Non-compliance was a duplication of claim. The 8% areas of concern were where the plantation management regime changed from high quality sawlog production due to poor growth or unsuitable trees.

Recommendation 2: That a procedure should be developed by Forestry Tasmania in consultation with DIER to retrospectively adjust Annual



Acquittals if Regime Changes or improved information becomes available.

Recommendation 3: When the plantation management Regime Changes away from high quality sawlog production any unspent TCFA funds allocated to that area should be redistributed to other areas to promote sawlog production.

The move away from conversion of native forests to plantations created opportunities for more efficient plantations being established on previously cleared land with better nutritional characters and better access to markets.

Rationalisation of the plantation programme on freehold land to supply planned markets would lead to a more competitive plantation based industry. Plantations should be concentrated around likely market nodes and ports.

The New Plantation pruning programme was being done to a good standard but the programme was falling behind schedule. 1st lift pruning to 2.4 metres has been done on 4,994 hectares, 2nd lift to 4.5 metres on 2,291 hectares and 3rd lift to 6.4 metres on 817 hectares. No pruning has been done so far on 8,461 hectares of the 13,455 hectares established. Either the pruning programmes are 41% to 74% behind schedule or growth rates are below plan.

Nearly one third of the New Plantation pruned coupes were due for thinning. Recent disruptions to the wood chip export market for thinning products and other factors have delayed the thinning programme. It is vital to the success of the TCFA IFM programme and to justify the investment in pruning that the thinning programme is brought back to schedule.

Recommendation 4: Every endeavour should be made to capture additional markets for thinning products as a priority.

Potential alternative markets include domestic pulpwood, veneers and biomass energy. The State and Federal governments may be able to support these endeavours with appropriate policies and tactics to encourage forest products industrial development and use of woody biomass energy.

Thinning is so important to the success of the TCFA IFM programme that thinning standards should be set and achievements monitored and reported in the Annual Acquittals.

Secondary fertiliser was applied to 13,449 hectares of New Plantation. No significant compliance issues were identified.

The sum of the areas of Existing Plantation pruned according to FOD exceeds the Annual Acquittals by 17%.

Existing Plantations had been pruned 1,433 hectares 1st lift, 10,228 hectares 2nd lift and 9,752 hectares 3rd lift. This programme was also falling behind schedule and 20% of the Existing Plantation pruning was taking place at age 7 or later. The pruning standards were satisfactory over 83% of the areas inspected, including some areas due for thinning classified as opportunities for improvement. There were numerous duplicate claims in the FOD resulting in 14% non-compliance.

The value of pruning was being eroded due to delayed thinning of the coupes.



Recommendation 5: That targets and standards be set for thinning New and Existing Plantations and that progress towards these targets be reported in Annual Acquittals.

The sum of areas of Existing Plantations Secondary Fertilised recorded on FOD exceeded the sum of areas in the Annual Acquittals by 2,407 hectares (14%) although, once again, the Annual Acquittals did not closely match the FOD records. The document review found all fertilising records in Existing Plantations were compliant.

Native forest thinning and Potential Sawlog Retention operations have treated 2,426 hectares of regrowth forest. This was 35% less than the area acquitted of 3,730 hectares and there was no match between the Annual Acquittals and the areas thinned. Records of the native regrowth thinning operations did not achieve a satisfactory level of accuracy.

Recommendation 6: That a more reliable system of recording native forest thinning achievements be developed by Forestry Tasmania.

In the field the even age native regrowth forests which were thinned were growing vigorously and the growth was on well-formed trees with future sawlog and veneer log potential. The thinning operations were commercial and self-funding.

Recommendation 7: That even age regrowth forests with access to markets be thinned as a priority activity.

The TCFA IFM programme created a significant resource of plantation capable of producing high quality sawlog and veneer logs.

There were discrepancies between the areas treated under the programme and the Annual Acquittals submitted by Forestry Tasmania.

While the plantations were generally well established there were important non-compliance, areas of concern and opportunities for improvement under the programme.

There were substantial decreases in the areas of plantation being managed to produce high quality sawlog and veneer logs due to Regime Change in areas of New Plantation.

The pruning programme needs to be implemented according to Forestry Tasmania management standard schedules.

Much of the plantation pruned and fertilised under the TCFA IFM programme will not produce significant quantities of sawlog and veneer logs unless there is an effective programme implemented to achieve timely thinning of treated plantations. Progress towards thinning targets was unsatisfactory from a silvicultural perspective (McKenzie, 2012). Failure to thin the plantations is likely to compromise production of the target levels of high quality sawlog and veneer logs.



2 Introduction

2.1 Project brief

The purpose of this review project was to confirm that the Tasmanian Community Forest Agreement (TCFA) Intensive Forest Management (IFM) activities, as reported in the Annual Acquittals by Forestry Tasmania from 2005-06 to 2010-11 inclusive, have been undertaken in compliance with the quality standards set out under the organisation's Australian Forestry Standard (AS4708) and ISO14001 compliant integrated quality management system and to provide a professional opinion on the adequacy and appropriateness of Forestry Tasmania's implementation of the TCFA IFM Program.

Under the Regional Forest Agreement, Forestry Tasmania was to provide a five yearly update on the sustainable sawlog supply from State Forests (SF) in 2012. To avoid duplication, this performance evaluation will focus on the implementation of the IFM activities undertaken to 30 June 2011.

Details of the brief were set out in a contract for services between The Crown in Right of Tasmania and Plantall Pty Ltd trading as Plantall Forestry Consultants dated 22 March 2012.

In conducting this performance evaluation we have extensively depended upon the operational records provided by Forestry Tasmania which were extracted from the Forest Operation Database.

2.2 Scope

The scope of the project was the TCFA IFM activities reported in the Annual Acquittals by Forestry Tasmania. The project was not to investigate other activities of Forestry Tasmania and was not to investigate the financial aspects of the TCFA IFM acquittals.

The project was to review Forestry Tasmania's quality management system processes and information underlying the annual IFM acquittal reports, and quality standard monitoring for IFM activities. In addition the project was to perform on-ground verification reviews on an appropriate sample of TCFA IFM coupes to ensure that the reported TCFA IFM activities have been undertaken, and conducted to a prescribed and acceptable standard.

2.3 Qualifications and experience

This review was completed by PLANTALL Forestry Consultants's principal consultant, David Wettenhall. He is a Registered Professional Forester (RPF) in the General Practising Forester Division and has been involved in private forestry in Australia since 1975. He was admitted to the degrees of Bachelor of Science Forestry (ANU, 1976) and Master of Forest Ecosystem Science (University of Melbourne, 2010). He is a full member of the Association of Consulting Foresters of Australia and a Fellow of the Institute of Foresters of Australia. His experience has included native forest log supply management, plantation establishment, management, harvesting, processing and marketing of forest products in softwood and hardwood plantations throughout southern Australia. He has practised in the hardwood plantation industry since 1990.



3 Description of the TCFA IFM Program

The TCFA was implemented through a Supplementary Tasmanian Regional Forest Agreement (Commonwealth of Australia, State of Tasmania, 2005) which provided:

33. Further to clauses 75 to 77 [Financial Commitments] of the RFA, the parties agree that further Intensive Forest Management will be used to mitigate the impact of new reserves and the reduction of clearfelling techniques within Old Growth Forest.

34. The Parties agree to jointly support, and the State will deliver, an integrated program of existing plantation productivity improvement and development, new plantation establishment and enhanced native forest thinning programs designed to maintain targets referred to in clause 77 of the RFA for sustainable sawlog and veneer log supplies to industry from State Forests.

Funding allocations in the original budget provided for \$96 million at \$6,000/ha for New Plantations (16,000 ha) to be cultivated, established, fertilised (2 applications post establishment) and pruned in 3 lifts. Payment is claimed upon establishment of the plantation and funds for future pruning and fertilising operations are held in escrow. Further \$15M were allocated for pruning Existing Plantations in 3 lifts at \$600/ha/lift and fertilising in 2 applications at \$351/ha/application (6,000 ha). Further \$4M were allocated to thin existing native regrowth forests.

In 2007 Forestry Tasmania ceased the practice of converting native forests to plantations. As a result, \$5 million of the funds were re-allocated from New Plantation establishment to improving the productivity of Existing Plantations and \$2 million were re-allocated from New Plantations to Native Regrowth thinning. Therefore, the revised area target for New Plantations was 14,000 hectares and for productivity improvements on Existing Plantations was 10,000 hectares (Attwood, 2012).

In summary, the TCFA agreed funding was to cover the notional areas of intensive forest management set out in Table 1:

Table 1 TCFA IFM funding allocations

		Cost/ha	Area (Ha)	Funds
New Plantation	Establishment	\$3,500		
	Pruning x 3 lifts	\$1,800		
	Fertilising x 2 applications	\$ 700		
	Sub-total	\$6,000	14,000	\$ 89M
Existing Plantation	Pruning x 3 lifts	\$1,800		
	Fertilising x 2 applications	\$ 700		
	Sub-total	\$2,500	10,000	\$ 20M
Native Regrowth	Thinning	Variable		\$ 6M
IFM	Total			\$115M

The TCFA IFM programme covered essential elements of high quality sawlog production including establishment of new plantations, pruning and fertilising of new and existing plantations and thinning of native regrowth forest. The values provided

were, in our opinion, commercially realistic to cover the silviculture operations and management. Thinning of plantations was an essential element of high quality sawlog and veneer log production which was not covered in the TCFA. No provision was made to cover the cost of land tenure for the programme.

It was notable that 73% of funds were allocated to establishment, pruning and fertilising of New Plantations. Existing Plantations were allocated 22% of funds and Native Regrowth forests 5% of funds.

The TCFA IFM has been documented within the existing Forestry Tasmania systems. We were not provided clear documentation of the rules governing the TCFA IFM. It was not clear which areas and operations were intended to be included in each acquittal. As a result, the Review could not determine which areas had been treated (planted, pruned, fertilised or thinned) but it was not always clear if it was a valid TCFA operation.

Forestry Tasmania was not impeded in acquitting TCFA funds to areas of plantation which were also funded from other sources including several Joint Forest Agreements (JFA). For example, plantations established as ten year pulpwood schemes under the Forestry Tasmania Trees Trust from 1997 to 2001 have been included in acquittals under TCFA IFM, where the investors bought a 50% share in the plantation to be realised in a commercial thinning for pulpwood at around age 10 to 12 years and the remaining pruned trees which were then 100% owned by FT would be grown on for sawlogs to be harvested at 20 to 25 years.



4 Review process and methodology

This review commenced in Hobart on 16th April 2012 with interviews of key staff of Forestry Tasmania who were familiar with the Integrated Management System and preparation of the Annual Acquittals for the TCFA IFM programme. The data which formed the basis of the Annual Acquittals were extracted from the Forest Operation Database (FOD). These data were provided in the form of spreadsheets for each of the elements of the IFM programme being new plantation establishment, pruning, fertilising and thinning of native forest regrowth. Records of each forest operation identified the detailed operation type (pruning lift, fertilisers applied, planting operation, thinning operation), coupe, dates of the operation, asset area, areas planned, area completed and area recorded in the acquittal.

These data were analysed and compared to the Annual Acquittals. The data were reviewed for anomalies such as duplication of claims and claimed areas inconsistent with the asset areas.

In order to focus the review where the TCFA funds were invested 20 coupes of new plantation were selected randomly by the Reviewer using a Probability Proportional to Size (PPS) technique. A degree of randomness was important to ensuring the review was not biased away from remote or inconvenient locations. PPS was applied using area of plantation as the %size+and coupes were ranked in order of size. A random number generator was then used to select coupes from the list until 20 had been selected. Selection proportional to area biased the inspections toward the coupes where more funds had been invested.

The randomly selected coupes were regarded as mandatory inspection coupes. Field inspections were planned around inspecting each of these coupes. A further 30 coupes which had been claimed in the acquittals to have been pruned or thinned native regrowth forest were randomly selected as priority inspection coupes. Other coupes were to be inspected coincidentally as the mandatory and priority coupes were being accessed.

Electronic map layers were provided by Forestry Tasmania for all of the coupes noted on their Geographic Information System (GIS) as being TCFA claimed coupes. These facilitated navigation to the coupes for inspection and diversion to additional coupes close to the route as opportune. The mapped coupe boundary areas on the GIS were verified and checked against the Report Areas on the FOD for the mandatory inspection coupes.

Field inspections were conducted from 16th April 2012 to 27th April 2012. Dr Peter Volker, Forestry Tasmania, Manager Field Services and/or local staff escorted the Reviewer to field inspections. Inspections commenced at the Forestry Tasmania Regional Office where records of the operations in the mandatory inspection coupes were inspected. The review then proceeded to the coupes, noting the planting and pruning status of TCFA coupes passed en-route to mandatory and priority inspection coupes. These were drive-by inspections. The mandatory and priority inspection coupes were generally walked and at least one 200 square metre plot assessed in the mandatory inspection coupes.

It was recognised that fertiliser claims could not be verified by field inspection because these operations do not leave persistent definitive indicators that the operation was completed. Claims for fertiliser operations were verified by document trails with preference given to original field documents such as actual GPS tracks of



helicopter flight paths, field supervisor operational records, fertiliser supply and contractor reports and invoices.

The status of each inspection coupe was categorised according to the criteria in Table 2:

Table 2: Review categories applied to inspected coupes

Compliance Rating	Compliant	Opportunity for Improvement	Area of Concern	Non-compliant
Plantation establishment	Planted and achieving more than 75% survival	Planted but survival <75%	Planted but more than 20% failure	Not planted
Pruning	FT Target stems/ha pruned to target height	Pruned but overdue for thinning or DOS 15-20 cm	DOS >20 cm or sweep >100% Diameter. Error in reported area	Not pruned as claimed or duplicated claim
Fertiliser	Documents indicate fertilised as claimed	Records do not verify application		Fertiliser was not applied
Thinning regrowth	Thinned leaving potential sawlog stems space to grow	Canopy gaps >0.1 ha, <100 sph PSR	<50 sph PSR	Not thinned



5 Review of Forestry Tasmania's IMS

Forestry Tasmania maintains a comprehensive Integrated Management System which covers quality procedures and standards, forest operation records and quality monitoring and evaluation. NCS International certified the management system as meeting the requirement of the Australian Forestry Standard AS4708 (Australian Forestry Standard, 2012).

At the core of the system was the Forest Operations Database (FOD) which was effectively an estate record of all operations. Each operation was subject to a Forest Practices Plan and field personnel are required to complete quality reports and update progress on operations. Entry of data was normally a pre-requisite to contractors being paid. This can be a problem if an operation was interrupted and partially complete for environmental or operational reasons. The contractors need payment so the FOD quality data pre-requisite has to be over-ridden. Original field documents are stored in District Office Coupe files.

Acquittal reports are prepared close to the end of the Financial Year by downloading data from FOD. Acquittal reports used mapped Operation Area (AN) where available or Planned Area where mapping was not available. There was potential for minor variations to actual areas. Planted areas are based on the areas cultivated. This was considered conservative because areas are sometimes planted uncultivated for operational and environmental care (e.g. stream side protection, steep slopes).

The Forest Operations Database did not identify specifically which operations had made up each annual acquittal of the TCFA IFM programme. This made the audit of acquittals difficult.

Recommendation 1: That Forestry Tasmania develops ways to tag each operation comprising the Annual Acquittals of TCFA.

Once reported, areas are fixed and there has not been any process to retrospectively adjust acquittals where variations are identified. Cumulative total areas are considered to be the critical data rather than the year by year figures.

Forestry Tasmania conducts internal audits each year to assess performance in silviculture, management and plantation productivity against 15 key indicators (McKenzie, 2012). This report was marked Commercial in Confidence. The report covered 39,640 hectares of hardwood plantation in which Forestry Tasmania has full or partial equity. This covered the 13,151 hectares of New Plantations established under TCFA, over 10,000 hectares of Existing Plantation which were part of the TCFA IFM programme plus other plantations which are not the subject of this review. Some of the relevant findings are presented below.

These results indicate a high standard of plantation establishment was being achieved.

The drop over time in pruning meeting quality standards was of concern. The major reasons for failure were insufficient pruned stems, high stocking of unpruned but suitable trees and surveys incomplete.

Application of secondary fertiliser was below target in 2011 reflecting budget constraints. This was expected to impact growth in future years.



Table 3: Plantation Performance Indicators (McKenzie, 2012)

Performance indicator	2011	2010	2009	2008	2007
Area planted with priority 1-3 genetics	38%	45%	55.5%	69%	66%
Area >90% survival	88%	83%	85%	84%	59%
Area successfully established at age 2	99%	99%	100%	100%	100%
% Operations meeting quality standards					
a) Site preparation	96%	97%	96%	95%	94%
b) Planting	100%	100%	98%	86%	81%
c) Hand fertilising	98%	93%	100%	98%	93%
d) Pruning (all lifts)	71%	76%	86%	91%	100%
e) Commercial thinning	77%	86%	100%	84%	66%
f) Pesticide operations	87%	88%	N/A	N/A	N/A
Area identified for 2 ^u fertiliser completed	52%	78%	96%	96%	100%
Clear wood areas pruned 3 lifts by age 5	81%	73%	80%	92%	99%
Changed regime by age 6	43%	34%	56%	27%	N/A
Area commercially thinned (Ha)	854	1350	922	1300	619
Area at age 12:					
a) Thinned & pruned	31%	31%	16%	28%	32%
b) Pruned not thinned	42%	36%	39%	8%	32%
c) Not pruned or thinned	26%	32%	45%	64%	28%

McKenzie concluded that current thinning progress was unsatisfactory from a silvicultural perspective and that a strategy was required to deal with existing plantations with respect to future wood flows.

The capability to undertake thinning operations has been severely impacted in the last two years by the lack of suitable markets for plantation thinning (primarily the export woodchip market) and the lack of availability of contractors with equipment suitable to this operation.

The high proportion of Regime Change was of concern as was the data showing that only about one third of the estate was thinned and pruned by age 12. This implies that each year 30% to 60% of high quality sawlog plantations were downgraded to pulpwood plantations. There may be some sawlog produced from low pruned trees but the yield of sawlog from these plantations will be significantly below TCFA IFM programme targets on those parts of the estate.



6 Verification reviews of TCFA IFM coupes

6.1 New Plantations

The TCFA IFM set out to deliver an integrated programme of new plantation establishment. Funding was provided for New Plantations to be established, fertilised and pruned to grow high quality sawlogs and veneer logs.

The Review took the view that New Plantations were those which had been established after 30th June 2004.

6.1.1 Establishment of New Plantations

6.1.1.1 Acquitted area verification

The FOD data provided by Forestry Tasmania as a list of coupes being New Plantations which were established, pruned and fertilised under TCFA IFM had total areas which did not correspond with the TCFA Annual Acquittals. This was an unexpected development, and the reconciliation of the data was outside the scope of the original audit request being an assumed given. Nevertheless, as having a complete list of IFM coupes was necessary in developing the audit, an attempt was made to explain why these datasets did not match.

Subsequent analysis of the FOD data identified duplicate establishment operations on 1,425 hectares which were not part of the TCFA Annual Acquittals. New Plantations on FOD established after 1st July 2004 to 30th June 2011 total 13,455 hectares which was 102% of the total of Annual Acquittals and 96% of the TCFA target for New Plantations (see Table 4).

Table 4: New Plantations – Establishment areas

New Plantation Area (Ha)	Acquittal Year							Total
	2005	2006	2007	2008	2009	2010	2011	
FOD data	2,335	587	1,835	3,661	3,065	1,404	567	13,455
Annual Acquittal	0	2,300	3,913	3,347	2,388	515	688	13,151

It was assumed the variances between Annual Acquittals and the FOD data were mainly due to timing issues. The season for establishing New Plantations in Tasmania is autumn to spring and operations are commonly underway but incomplete at the end of the financial year which was the TCFA reporting period.

6.1.1.2 Joint Ventures

Nearly 30% of the New Plantations were established under Joint Forestry Agreements between Forestry Tasmania and other investors (see Table 5). The New Plantations include 9,510 ha (71%) of TCFA and IFM plantations, 685 ha under Gunns Tamar Tree Farm Projects, 3,194 ha under Gunns Plantations Platform Tasmania Projects and 65 ha on other Joint Forest Agreement land. We are unaware of any documentation prohibiting this practice.



TCFA funding was specifically directed to plantation establishment and productivity improvement.

The co-investment funds may have been a means to fund access to private freehold land. The TCFA IFM funding did not provide funds for land purchase or rent. Forestry Tasmania had historically established most of its plantations on Crown Land. However, the JFAs may have other constraints on the use of their funds and management of the schemes. For example, it was common for managed investment schemes costs to be fully tax deductible to the investors on the basis they were not capital expenses such as land. Managed investment schemes were required to have Australian Tax Office Product Rulings strictly set out the basis upon which schemes were to be managed to retain the tax deductibility status.

The terms of the JFA arrangements have not been reviewed.

The Review inspected some of the JFA plantations and they were generally compliant with the Forestry Tasmania standards. We have not verified the rights of Forestry Tasmania to manage the JFAs for high quality sawlog production as it was outside the audit scope.

Table 5: New Plantations – Establishment by acquittal year and JFA

Area (Ha)	Acquittal Year							Total
	2005	2006	2007	2008	2009	2010	2011	
JFA								
TCFA IFM on SF	1,910	306	1,308	2,701	2,107	932	246	9,510
Gunns TTF JV	204	0	20	128	237	49	47	685
Gunns PPT JV	221	280	491	832	721	408	241	3,194
Other			15			16	33	65
Total	2,335	587	1,835	3,661	3,065	1,404	567	13,455

6.1.1.3 Field reviews

The Reviewer inspected 102 New Plantation coupes which represented 2,728 hectares (20%) of the TCFA New Plantations acquitted.

We note that much of the plantation was established on sites which were previously native forest. There was strong regrowth of understorey plants which, in water limited environments would compete with the crop trees for moisture. Forestry Tasmania's silviculture standards do not require these plants to be controlled. We are not in a position to disagree with Forestry Tasmania's experience and research on this matter but to maximise productivity more weed control would normally be recommended on sites where rainfall was less than 1,000 mm annually.

The mandatory inspection individual coupe areas on the GIS were in agreement with the Report Areas on FOD and claimed as TCFA coupes. The Review did not set out to audit the accuracy of mapping but where we tracked boundaries of coupes with a hand held GPS the mapping was accurate.



Table 6: New Plantations – Establishment results of review

New Plantations establishment review	Year acquitted							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant	66%	100%	41%	96%	93%	100%	100%	89%
Opportunity for Improvement	0%	0%	0%	0%	0%	0%	0%	0%
Area of concern	34%	0%	28%	4%	7%	0%	0%	8%
Non-compliant	0%	0%	30%	0%	0%	0%	0%	3%

Of the New Plantation coupes inspected, 2,453 hectares (89%) were regarded as Compliant (see Table 6). There was one duplicate claim for coupe TP036A of New Plantation (69 hectares, 3% of inspected areas) which was regarded as Non-Compliant. The 8% Areas of Concern were 220 hectares in 5 coupes of New Plantations which were under performing and were unlikely to produce sawlogs. Under performance was due to a range of historical factors which were not always evident at the time of inspection including drought, inappropriate site selection, weed competition, animal browsing and insect predation.

There was inadequate process documentation to guide Forestry Tasmania in the event of plantation Regime Change. There were instances where field staff appropriately decided to change the regime from high quality sawlog production to pulpwood production on whole or parts of coupes. This has been referred to as Regime Change. For example, HP018B had poor form E. globulus trees and AR064D had parts of poor stocking and poor growth. These issues cannot always be anticipated before planting. The decision not to pursue sawlog production is most efficiently made as soon as possible in the life of the plantation. In the case of plantations established under the TCFA there would be funds available for later operations which are no longer going to be applied to the area subjected to the Regime Change.

Recommendation 2: That a procedure should be developed by Forestry Tasmania in consultation with DIER to retrospectively adjust Annual Acquittals if Regime Changes or improved information becomes available.

When the decision is made and approved to no longer pursue sawlog production from a plantation established under the TCFA, it is my opinion that any funds for sawlog production operations which have not been undertaken should be redistributed to other areas to promote sawlog production. We found no documentation which required this adjustment to be made under the TCFA IFM programme.

Recommendation 3: When the plantation management Regime Changes away from high quality sawlog production any unspent TCFA funds allocated to that area should be redistributed to other areas to promote sawlog production.



6.1.2 Pruning New Plantations

Pruning plantations for high quality sawlog and veneer production was scheduled in 3 operations (lifts) to avoid removal of foliage contributing to tree growth, minimising pruning on non-crop trees and to manage the size of the stem at the point of pruning. Sometimes the pruning was completed to a specified height and alternatively to a variable height with specified diameter of stem. There can be more than 3 lifts to properly prune each tree. Therefore, the area pruned is expected to exceed the area of New Plantation many fold and when complete at least 3 times the area planted should be pruned.

Pruning was appropriately scheduled according to the growth of the trees. Only trees with potential to grow into final crop high quality stems should be pruned. Non-crop trees should be thinned to provide room and resources for final crop trees to increase diameter rapidly. Forestry Tasmania Operation Specifications aim to 1st lift prune 180 to 400 stems per hectare to 2.4 metres, 2nd lift prune 180 to 350 stems per hectare to 4.5 metres and finally 3rd lift prune 180 to 350 stems per hectare to 6.4 metres. The maximum Diameter Over Stubs (DOS) should be less than 150 mm. Forestry Tasmania would normally change the regime to a non-pruning regime if pruning has not been conducted by age 6 (McKenzie, 2012).

There was no separate acquittal for pruning New Plantations because these costs are included in the initial establishment payment. Table 7 presents the areas of New Plantations which have been pruned by the year of planting (see New Plantation establishment acquittals) and the year in which pruning was undertaken.

Table 7: New Plantations - Pruned area by Plant Year

New Plantations Pruned (Ha)	Year pruning undertaken							Total
	2005	2006	2007	2008	2009	2010	2011	
Plant year								
2005			11	404	889	967	1,137	3,407
2006					185	235	245	665
2007				51	191	541	1,411	2,193
2008					10	211	1,652	1,873
2009							165	165
Grand Total			11	455	1,274	1,954	4,610	8,304

Table 8 represents the same data by Planting year and pruning lift. The unpruned areas are also shown derived by subtracting the 1st lift pruned area from the planted area for each year.

Table 8: New Plantation - Pruning by lift and Plant Year

New Plantations Pruned (Ha)	Plant year							Total
	2005	2006	2007	2008	2009	2010	2011	
Pruning lift								
Form pruned			80	10	112			203
1 st lift 2.4 m	1,453	345	1,489	1,653	53			4,994
2 nd lift 4.5 m	1,278	234	579	201				2,291
3 rd lift 6.4 m	676	86	45	9				817
Unpruned (Planted . 1 st lift)	882	242	346	2,008	3,012	1,404	567	8,461



The FOD data shows that pruning on New Plantations included 203 hectares of Form pruning, 4,994 hectares of 1st lift, 2,291 hectares 2nd lift and 817 hectares of 3rd lift pruning (see Table 8). Based on Forestry Tasmania's standard regime, plantations should be pruned 3 times by around age 5. Based on this, it was concerning that of the 8,418 hectares of New Plantations established to 2008 only 4,941 hectares (59%) have been 1st lift pruned. Similarly, of the 2,922 hectares of New Plantation established in 2005 and 2006, only 762 hectares (26%) have been 3rd lift pruned. This would indicate that either the pruning programmes are 41% to 74% behind schedule or growth rates are below plan which will affect overall sawlog yields.

Pruning has been undertaken on Forestry Tasmania plantations and Joint Venture Agreement plantations (Table 9), where Forestry Tasmania retains the interest in the pruned stems after pulpwood (usually the interest of the joint venture partner) has been removed in a commercial thinning about half way through the life of the plantation.

Table 9: New Plantations - Pruning by JFA

New Plantations Pruned (Ha)	Year undertaken							Grand Total
	2005	2006	2007	2008	2009	2010	2011	
JFA								
TCFA IFM on SF			11	390	956	1,508	3,608	6,473
Gunns PPT				65	318	447	997	1,826
Other plantation							5	5

Pruning was undertaken on 6,473 ha (78%) of Crown Land, 1,826 ha of Gunns project land and 5 ha of other land.

Pruning was inspected in 40 coupes covering 1,163 hectares (14%) of pruned New Plantations. A summary of the review results is presented in Table 10.

Table 10: New Plantations - Pruning review results

New Plantations pruning review (% of area reviewed)	Year undertaken							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant				100%	89%	61%	53%	64%
Opportunity for Improvement				0%	11%	29%	44%	32%
Area of concern				0%	0%	0%	0%	0%
Non-compliant				0%	0%	9%	4%	4%

The Non-Compliant coupes were LI119D which was a duplicate claim, UR024C where it was not evident that a second lift had been completed to 4.5 metres and SR027J where pruning had been completed to 4.5 metres but not to the 3rd lift standard of 6.4 metres.

Thinning at age 8 to 12 years is a critical part of the overall plantation sawlog regimes to ensure sufficient high quality sawlog production.

A large proportion (32%) of coupes were classified Opportunities for Improvement. In the vast majority of cases these were coupes which had been pruned satisfactorily and were due for thinning. Thinning was not a funded operation under the TCFA IFM



programme. Thinning operations would be approximately cost neutral when harvested commercially.

Non-commercial thinning is quite expensive. In some cases where site conditions were known to make commercial thinning unviable an earlier non-commercial thinning was carried out at the time of final lift pruning to leave only pruned trees standing.

The collapse in Tasmania woodchip export markets, loss of contractor capacity and access to ports has meant that there was no viable market for commercial plantation thinning just as thinning operations were due to commence in TCFA New Plantations products. This has significantly impacted this aspect of the regime management.

Recommendation 4: Every endeavour should be made to capture additional markets for thinning products as a priority.

Thinning of plantations is an essential component of an integrated programme to maintain sawlog and veneer log supplies. Forestry Tasmania has undertaken thinning of plantations but the extent of this thinning has not been reported in Annual Acquittals and therefore, is not a subject of this audit. It is recommended that targets and standards be set for thinning of New and Existing Plantations and that progress towards these targets be reported in Annual Acquittals.

Recommendation 5: That targets and standards be set for thinning New and Existing Plantations and that progress towards these targets be reported in Annual Acquittals.

6.1.3 Secondary fertilising of New Plantations

Primary fertiliser is considered a plantation establishment operation and is applied routinely. Secondary fertiliser is applied to promote productivity of the plantations where it is considered the return on investment is justified (i.e. growth improvement more than compensates for expenditure on fertiliser).

There was no separate acquittal for application of secondary fertiliser of New Plantations because these costs are included in the initial establishment payment. A summary of FOD data showing these operations is presented in Table 11.

Table 11: New Plantations – Secondary Fertilised area by Plant Year

New Plantations Fertilised (Ha)	Year undertaken							Total New Plantations Fertilised
	2005	2006	2007	2008	2009	2010	2011	
Plant year								
2005	36	196	728	692	673	583	574	3,484
2006			45	123	95	9	76	347
2007			135	860	412	1,005	493	2,904
2008				132	1,391	1,619	1,413	4,555
2009					101	903	991	1,996
2010						44	119	164
Grand Total	36	196	908	1,808	2,673	4,163	3,666	13,449



Secondary fertilising has been undertaken on Forestry Tasmania plantations and Joint Venture Agreement plantations (Table 12).

Table 12: New Plantations – Secondary Fertilised area by JFA

New Plantations Fertilised (Ha)	Year undertaken							Grand Total
	2005	2006	2007	2008	2009	2010	2011	
JFA_NAME								
TCFA IFM on SF.	36	152	908	1,671	2,631	3,788	3,422	12,608
Gunns TTF	0	44	0	35	0	40	66	185
Gunns PPT				102	42	335	178	656
Grand Total	36	196	908	1,808	2,673	4,163	3,666	13,449

Fertilising of New Plantations was undertaken on 12,608 ha (94%) of FT land, 185 ha of Tamar Tree Farm projects and 656 ha of Plantations Platform Tasmania land. This reasonably reflects the better nutrient status of TTF and PPT plantations established on formerly cleared agricultural land.

As noted above, it was impossible to field verify fertilising has been correctly applied more than a few weeks after the operation because the evidence dissolves. Secondary fertilising records were reviewed as a desktop exercise for 12 coupes covering 558 hectares (4%) of fertilised New Plantations.

Table 13: New Plantations - Secondary fertiliser review results

New Plantations fertilising review (% of area reviewed)	Year undertaken							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant				100%	100%	100%	90%	95%
Opportunity for Improvement				0%	0%	0%	10%	5%
Area of concern				0%	0%	0%	0%	0%
Non-compliant				0%	0%	0%	0%	0%

The Opportunity for Improvement was for coupe SF159A for which the documentation of fertilising was not located. This was likely to be a record filing issue rather than evidence the operation was not undertaken. The fact that it was on FOD was evidence that the operation was undertaken.



6.2 Existing Plantations

The TCFA IFM funding provided for Existing Plantations to be fertilised to increase plantation growth and for existing plantations to be pruned to increase the growth of high quality sawlogs and veneer logs.

The Review took the view that Existing Plantations were those which had been established on or before 30th June, 2004 to be consistent with the definition of New Plantations.

6.2.1 Pruning Existing Plantations

The Review examined the pruned areas documented on FOD. The data includes all types of pruning including form pruning, 1st, 2nd, and 3rd lift pruning and variable lift pruning.

Table 14: Existing Plantations - Pruned area by plant year

Pruned Area (Ha)	Year acquitted							Total
	2005	2006	2007	2008	2009	2010	2011	
1997			26					26
1998	156	90	111	38				395
1999	223	663	381			47		1,314
2000	1,619	2,082	823	613	91	32		5,260
2001	2,586	2,387	1,714	897	31	28	76	7,719
2002	2,014	2,870	1,429	1,175	273	212	160	8,133
2003	200	458	395	168	73	119		1,412
2004		116	699	806	1,213	743	931	4,508
Review Total	6,799	8,666	5,578	3,697	1,681	1,181	1,166	28,767
Acquittals	1,838	9,030	5,465	3,802	1,982	1,175	1,273	24,565

The sum of areas of Existing Plantations pruned exceeded the sum of areas in the Annual Acquittals by 4,202 hectares (+17%).



The areas pruned included 1,433 hectares of 1st lift, 10,228 hectares of 2nd lift and 9,752 hectares of 3rd lift pruning. Vigorous plantations should be pruned 3 times by age 5 years so that the pruned area should be approximately 3 times the planted area by the sixth year. Table 14 indicates that the pruning programme was falling behind schedule or that the plantation vigour was lower than desirable for sawlog production.

It was not uncommon for the same areas of forest to have more than 3 pruning operations acquitted and one coupe had six pruning operations (see

). However, this can be valid where the coupe is split into separate areas.

Table 15: No. of pruning operations

No. of pruning operations	No. of coupes
1	50
2	72
3	149
4	22
5	3
6	1
Total	297

ha of

Pruning was undertaken on 21,412 ha (74%) of Crown Land, 1,405 ha of Tasmanian Tree Trust projects, 4,812 ha of Gunns projects and 2,703 other Existing Plantations.

Table 16: Existing Plantations - Pruning by JFA

Area (Ha)	Year acquitted							Grand Total
	2005	2006	2007	2008	2009	2010	2011	
JFA								
IFM, FT on SF	4,254	5,613	3,876	2,802	1,244	1,011	1,049	19,848
TTT	634	558	162	52				1,405
Gunns TTF & PPT	882	1,466	1,201	715	259	170	117	4,812
Other	1,029	1,030	339	128	177	0	0	2,703
Grand Total	6,799	8,666	5,578	3,697	1,681	1,181	1,166	28,767

The Review inspected 184 coupes and records of pruning over 6,854 hectares (28% of acquitted area). A summary of the inspection results is presented in Table 17.

Table 17: Existing Plantations - Pruning review results

Existing Plantations pruning review (% of area reviewed)	Year acquitted							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant	68%	48%	78%	56%	36%	50%	14%	57%
Opportunity for Improvement	6%	32%	20%	34%	57%	35%	29%	26%
Area of concern	0%	4%	0%	6%	0%	13%	0%	3%
Non-compliant	25%	17%	1%	5%	7%	1%	57%	14%

Fully Compliant pruned Existing Plantations were only 57% of the Annual Acquittals. The Non-compliant coupes were 22 duplicate claims and coupe MX261V in which contrary to the FOD record, 3rd lift pruning was incomplete. The duplicate claims were instances of the same operation being claimed more than once on an area. For



example, there were two claims for 2nd lift pruning on coupe VD006B both claiming the entire coupe area. The Areas of Concern were 5 instances where the treated area was overstated on FOD. Details were not available to say if this error transferred into the Annual Acquittal because we do not know which coupes make up the surplus pruned areas on FOD over the Acquittals. The Opportunities for Improvement were pruned areas due for thinning. Effectively, pruning standards were achieved on 83% of the area reviewed. It is relevant that Forestry Tasmania's internal audit reported 71% of pruning operations met their quality standards.



6.2.2 Fertilising Existing Plantations

The FOD records show the following areas had Secondary Fertiliser applied.

Table 18: Existing Plantations – Secondary Fertilised area by plant year

Secondary fertiliser area (Ha)	Year acquitted							Grand Total
	2005	2006	2007	2008	2009	2010	2011	
Plant year								
1989				41				41
1990				86			29	115
1991	12	12		15				40
1992	26	26		99		71		223
1993	105	97		79	28	67	67	444
1994		17				154	94	265
1995	158	156	156			148		617
1996	14	33		16	42	127		232
1997	50			107	43	67		267
1998	73	22	53	152	6			305
1999	626	276	66	655	16	298	106	2,044
2000	856	355	290	1,179	384	475	464	4,001
2001	926	284	387	613	490	416		3,117
2002	1,367	739	203	894	694	251	176	4,325
2003	93			39	114	126	64	435
2004	73	645	824	459	511	648	381	3,541
Grand Total	4,379	2,662	1,978	4,434	2,329	2,847	1,381	20,010
Acquittals	1,496	2,677	2,042	4,386	2,487	3,092	1,423	17,603

The sum of areas of Existing Plantations Secondary Fertilised recorded on FOD exceeded the sum of areas in the Annual Acquittals by 2,407 hectares (14%) although, once again, the Annual Acquittals did not closely match the FOD records.

Fertilising of Existing Plantations was undertaken on 16,035 ha (80%) of Forestry Tasmania owned plantation, 1,318 ha of Tasmanian Tree Trust plantation, 226 ha of Tamar Tree Farm projects, 1,521 ha of Plantations Platform Tasmania land and 910 ha of other plantations.

The Review examined the records of areas which had secondary fertiliser applied documented on FOD. These represented 3% of the area included in the Annual Acquittals.

It was not uncommon for the same areas of forest to have more than 1 fertilising operation reflecting ongoing nutrient requirements. As noted above, it was not possible to verify that fertilising has been done in the field and this review was limited to a desktop check of documentation.



Table 19: Existing Plantations – Secondary Fertilising review results

Existing Plantations fertilising review (% of area reviewed)	Year acquitted							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant	100%	100%	100%					100%
Opportunity for Improvement								
Area of concern								
Non-compliant								

All of the Existing Plantation Secondary Fertilising records inspected were in order.



6.3 Thinning native regrowth forests

Native regrowth forests were to be thinned under the TCFA IFM programme. Forestry Tasmania has undertaken thinning (THN) operations in coupes typically clear felled and regenerated since the advent of pulpwood markets in the early 1970s.

Forestry Tasmania also undertake thinning operations in uneven-aged native forests they refer to as Potential Sawlog Retention (PSR) operations in which trees with potential to develop into sawlogs and veneer logs are retained while trees with less potential are harvested. Some habitat trees and trees to protect regeneration are retained to maintain stocking within prescribed limits. This was similar to a shelterwood silvicultural system.

There were 72 Native Regrowth Thinning operations on the FOD dataset provided to the Review with a total area of 2,926 hectares. Upon examination of the data it was clear that many operations had been planned but never actioned (probably due to seasonal constraints). As a result there were numerous operations which duplicated the area actually thinned with a total area of 500 hectares (17% of the FOD records). The duplicate records have been excluded from Table 20 and Table 21 below.

Table 20: Native regrowth forest - Thinned area

Thinned area (Ha)	Year acquitted							Grand Total
	2005	2006	2007	2008	2009	2010	2011	
Operation type								
Commercial Thinning of NF		222	164	99	269	215	44	1,013
Potential Sawlog Retention		78	187	103	408	432	205	1,413
FOD Total (x-duplicates)		300	351	202	677	647	249	2,426
Acquittal area	220	339	1,100	715	70	943	343	3,730

There was no match between the Annual Acquittal areas and the area thinned recorded on FOD each year. The sum of areas of thinned native forest recorded on FOD (excluding duplications) was 1,304 hectares (35%) less than the Annual Acquittals

The review inspected 12 native forest coupes and records of thinning in the FOD which covered 510 hectares (14% of acquitted area).

Table 21: Native regrowth forests - Review results

Native forest thinning review (% area of reviewed x-duplication)	Year acquitted							TCFA Total
	2005	2006	2007	2008	2009	2010	2011	
Compliant		100%		100%	100%	100%	71%	89%
Opportunity for Improvement								
Area of concern								
Non-compliant		0%		0%	0%	0%	29%	11%

The Non-compliance was due to coupe EV016C which was included in FOD but the operation was not completed. This was because the operation commenced but was



discontinued at an early stage. In order to close off the operation it was erroneously entered as completed.

Some of the PSR operations can be expected to be self-funding. That is, they can be expected to yield sufficient merchantable product to cover any costs of thinning. Using TCFA funds on these operations may forego opportunities to thin other regrowth forests which would make better use of the funding.



7 Adequacy of the TCFA IFM program

The brief specifically required a professional opinion on the adequacy and appropriateness of Forestry Tasmania's implementation of the TCFA IFM Programme.

There are some current questions as to the suitability of hardwood plantations and in particular *Eucalyptus nitens*, as resources for high quality sawlogs and veneer logs. These question the appropriateness of the TCFA IFM program in total rather than Forestry Tasmania's implementation of the Programme.

The programme of plantation establishment has been generally successful and the plantations are, in my professional opinion, well managed. Furthermore, the Forest Operation Database was a suitable facility to record management activities and operations and for the preparation of Annual Acquittals.

Adequacy of the TCFA IFM Programme implementation requires the implementation of the Programme to the extent it is able, to meet the objectives of the TCFA IFM. It was outside the scope of this audit to review the sustainable yields from the plantation estate. There have been a number of alternative reviews which provide information on plantation wood flows in Tasmania.

The sustainable high quality sawlog supply levels are reviewed at 5 yearly intervals under the RFA and were updated in the Sustainability Review 2007 (Forestry Tasmania, 2007). More recent reviews have been undertaken as part of the Intergovernmental Agreement process (Burgman & Robinson, 2012 and Forestry Tasmania, 2011)

Multiple native forest management scenarios were evaluated as part of the Independent Verification Group work towards the Intergovernmental Agreement (Burgman & Robinson, 2012). The scenarios varied the allocation of new native forest reserves and headroom+margins for productivity. It concluded that allocation of new reserves would reduce the availability of high quality sawlogs beyond the 155,000 m³ per year ongoing commitment levels. It follows that the objectives of the TCFA could not be met.

In 2011 Forestry Tasmania confirmed that their plantation estate could supply high quality sawlog from plantations at the rates 28,000 m³ per year from 2016 to 2020, 88,000 m³ per year from 2021 to 2030 and 157,000 m³ per year from 2031 to 2050 (Forestry Tasmania, 2011).

The Sustainability Review 2007 confirmed the ongoing availability of 300,000 m³ per year of high quality eucalypt sawlogs on a sustainable basis. The Sustainability Review 2007 assumed most New Plantations would be high pruned to produce category 3 sawlogs.

The Integrated Forest Strategy (Forestry Tasmania, 2005) identified a target for the TCFA of supplying 115,000 m³ of high quality sawlog each year from plantations from 2022 as part of the strategic plan to make available 300,000 m³ of high quality sawlogs and veneer logs annually. The review of sustainable high quality eucalypt sawlog supply (Forestry Tasmania, 2007) predicted plantations could supply 160,000 m³ per year from 2020. This was determined to be achievable from a plantation estate of 19,544 hectares. It was critical to production of high quality sawlog and veneer logs that pruning and thinning be done on a timely basis (Wood, 2009).



Forestry Tasmania reported the area of eucalypt plantation on State Forest managed for sawlog with high pruning and commercial thinning was 15,772 hectares in July 2007. The TCFA IFM programme has established a further 6,938 hectares since 2007 so that the total area should be 22,710 hectares less Regime Changes.

The reduction in areas being 3rd lift pruned in the last 3 years (Table 3) due to financial constraints was a threat to achieving the objectives of the TCFA IFM programme.

The incidence of Regime Change (see Table 3) and delays in thinning plantations will impact on the production of high quality sawlog and veneer logs.

The Sustainability Review 2007 indicated that thinned regrowth would need to supply approximately 50,000 m³ per year from 2030 to 2070. This should be achievable by harvesting 500 hectares per year of thinned native forest estate yielding 100 m³/ha of sawlog. This would require thinned native forest resources over approximately 20,000 hectares. The TCFA IFM programme has thinned less than 3,000 hectares to date.

From these studies it was apparent that the Tasmanian forests products sector will be increasingly dependent upon future plantation resources for high quality sawlogs and veneer logs. To that end it is vital that the remaining TCFA funds be used to maximise productivity of the intensively managed forests.

The implementation of the thinning programme is vitally important to the adequacy of the TCFA IFM Program. Forestry Tasmania should be encouraged to give high priority to thinning the plantations and suitable regrowth forests. Development of alternative markets to export woodchips such as domestic pulpwood, veneer and/or biomass for energy generation would support the thinning programme. Plantation thinning achievements should be reported in the TCFA Annual Acquittals.



8 Plenary issues

8.1 Management of TCFA IFM

The Review was complicated by a lack of clear documentation of funding agreements and objectives. The basis of the TCFA IFM programme was documented in the Supplementary RFA 2005 but there should have been more detailed documentation as to what was to be included in the programme.

The Forest Operation Database is a suitable facility to record management activities and operations and for the preparation of Annual Acquittals. However, for this particular audit, Annual Acquittals were impossible to match on an annual basis against FOD records because IFM operations were not tagged in FOD and the detail of annual extracted records was also not recorded by Forestry Tasmania to allow future reconciliation. This has greatly complicated the audit process.

Although outside the scope of this Review, Forestry Tasmania could look at ways to tag all operations which were incorporated into Annual Acquittals so that the acquittals can be recalled with certainty.

There should be a process to adjust the annual acquittal returns as better information becomes available.

When the decision is made and approved to change regime and no longer pursue sawlog production from a plantation established under the TCFA, any funds for sawlog production operations which have not been undertaken should be redistributed to other areas to promote high quality sawlog production. These decisions need to be taken into account when reviewing the future availability of sawlogs.

There should only be one claim payable for each operation on any area of forest. For example, there were a number of instances where more than three claims for pruning have been acquitted over the same area. There were also instances of duplicate claims for establishing New Plantations on the same area, particularly infill and replanting failed areas. It would be appropriate for failed operations to be brought up to standard within the initial contract.

8.2 New Plantations

The total area of New Plantations established under the TCFA IFM programme was 13,455 hectares. The area of New Plantations acquitted was 13,151 hectares. There was no match each year between the area of New Plantation established and the Annual Acquittal.

Joint Forest Agreements affect 30% of the New Plantations established.

The New Plantations were established to a high standard. Of 2,728 (22%) of New Plantation establishment inspected and reviewed, 89% were compliant and only 3% were non-compliant. The key issues for consideration were the impact of Regime Changes.

The total area of New Plantations which have been pruned was 8,304 hectares of which 203 hectares were Form pruning, 4,994 hectares 1st lift, 2,961 hectares 2nd lift and 817 hectares were 3rd lift pruning. The pruning programme for New Plantations was falling behind schedule.



The pruning was generally executed to a high standard with 83% compliance to standards. Form pruning has been claimed and there was one incorrect claim for pruning. Thinning was due in 36% of the pruned coupes. The thinning programme is essential to realise the benefits of pruning in production of high quality sawlogs.

The total area of New Plantations which have received secondary fertiliser was 13,449 hectares. Fertilising was audited using documentary records because evidence of fertiliser application does not persist on site. Of 558 hectares (4%) checked it was generally compliant.

The move away from conversion of native forests to plantations creates opportunities for more efficient plantations being established on previously cleared land with better nutritional characters and better access to markets.

Rationalisation of the plantation programme on freehold land to supply planned markets would lead to a more competitive plantation based industry. Plantations should be concentrated around likely market nodes and ports.

8.3 Existing Plantations

The area of Existing Plantations which were pruned was 28,767 hectares which exceeded the sum of the area included in Annual Acquittals by 4,202 hectares. Duplication of coupes included in the Annual Acquittals contributed 10% non-compliance. There were also 4% of coupes by area in which the operational area was overstated. Once again, the thinning programme was delayed and presented an opportunity for improvement of the Intensive Forest Management programme.

The sum of areas of Existing Plantations secondary fertilised recorded on FOD was 20,010 hectares which exceeded the sum of areas in the Annual Acquittals by 2,407 hectares. To the extent that this can be verified, the fertilising was compliant with Forestry Tasmania's standards.

8.4 Thinning native regrowth forests

The native forest thinning part of the IFM programme record keeping was less accurate than the plantation parts of the IFM programme.

Thinning was recorded on FOD for 1,230 hectares of regrowth forest and Potential Sawlog Retention operations were applied to 1,696 hectares of regrowth forest. The total area treated was 2,926 hectares which was 804 hectares less than the total 3,730 hectares acquitted. There was no match between areas treated and each annual acquittal. The sum of areas of treated native forest was 834 hectares less than the areas acquitted up to 30th June 2011.

Recommendation 6: That a more reliable system of recording native forest thinning achievements be developed by Forestry Tasmania.

The native regrowth forest thinning programme has great potential to contribute to the supply of high quality sawlog and veneer logs. Priority for funding should be directed towards thinning pole sized even aged regrowth. Mixed aged stands harvested with Potential Sawlog Retention should be self-funding where possible.

Recommendation 7: That even age regrowth forests with access to markets be thinned as a priority activity.



9 Findings

The focus of Forestry Tasmania's activities to meet its obligations under the TCFA IFM has been the establishment, fertilising and pruning of New Plantations and fertilising and pruning of Existing Plantations. They have also undertaken thinning of native regrowth forests.

In summary, the results of the review for activity between 2004/05 and 2011/12 are set out in Table 22. The IFM programme was an ongoing programme so these are not final figures.

Table 22: Summary of findings

Operation	New Plantations			Existing Plantations		Native Forest	Total
	Established	Pruned	Fertilised	Pruned	Fertilised	Thinned	
FOD records area (Ha)	13,455	8,304	13,449	28,767	20,010	2,926	86,911
Annual Acquittals (Ha)	13,151			24,565	17,603	3,760	
Inspected/Reviewed (Ha)	2,728	1,163	558	6,855	470	510	12,284
Non-Compliant (Ha)	69	46	0	958	0	149	1,222
Area of Concern (Ha)	220	112	0	210	0	0	542
Opportunity for Improvement (Ha)	0	375	28	1,774	0	0	2,177
Compliant (Ha)	2,440	630	530	3,912	470	361	8,343

The TCFA IFM programme created a significant resource of plantation capable of producing high quality sawlog and veneer logs.

There were discrepancies between the year by year areas treated under the programme and the Annual Acquittals submitted by Forestry Tasmania. The total area of hardwood plantations established by Forestry Tasmania for high quality sawlog and veneer log production exceeded the areas of New Plantations in the Annual Acquittals for the TCFA IFM programme. The total areas of Existing Plantation pruned and secondary fertilised exceeded the areas reported in the Annual Acquittals. The area of native regrowth forest which had been thinned was less than the areas reported in the Annual Acquittals.

While the plantations are generally well established there were important non-compliance, areas of concern and opportunities for improvement under the programme.

There were substantial decreases in the areas of plantation being managed to produce high quality sawlog and veneer logs due to Regime Change in areas of New Plantation.

The pruning programme needs to be implemented according to Forestry Tasmania management standard schedules.

Much of the plantation pruned and fertilised under the TCFA IFM programme will not produce significant quantities of sawlog and veneer logs unless there is an effective programme implemented to achieve timely thinning of treated plantations. The thinning programme is significantly behind schedule and under the current circumstances of markets and funding it is unlikely that these deficiencies will be addressed in the near future. This is likely to compromise the ability of plantations to meet the requirements of the sustainable high quality eucalypt sawlog supply strategy set out in the Sustainability Review 2007 (Forestry Tasmania, 2007).



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11 Glossary of terms and abbreviations

Existing Plantation means plantations established before 1st July 2004.

FOD means Forest Operations Database maintained by Forestry Tasmania.

FT means Forestry Tasmania.

Form pruning means pruning in the first year or two to eliminate major bends and forks in the main stem of a tree so that it grows straight.

GIS means Geographic Information System.

Ha means hectares.

IFM means Intensive Forest Management.

JFA means Joint Forest Agreement. In this report it includes Forestry Tasmania's tenure classifications including their own forests and joint ventures with investors and other companies.

New Plantation means plantations cultivated for planting after 30th June, 2004.

PPT means Plantation Platform of Tasmania was a partnership with Gunns, Forestry Tasmania, Daio Paper, JFE Shoji Trading Corporation and a number of their customers

PSR means Potential Sawlog Retention operations in which mixed age forests are thinned retaining potential sawlog regrowth (advanced growth), habitat trees and a target basal area.

Regime Change means the silvicultural regime which aimed for high quality sawlog production requiring straight stems, high growth rates, pruning, thinning and fertilising was changed to a pulpwood regime which is less demanding in stem straightness, plantation vigour and can tolerate branches with lower cost inputs.

Secondary Fertiliser means fertiliser applied after the establishment phase of plantation management. Fertiliser is routinely applied close to the time of planting (Primary Fertiliser). Subsequent Secondary Fertiliser may be applied as justified to promote growth or to correct deficiencies during the growth phase of the plantation management.

sph means stems per hectare so 50 sph PSR means that 50 stems per hectare Potential Sawlog Retention.

TCFA means Tasmanian Community Forest Agreement as expressed in the Supplementary Regional Forest Agreement 2005.

THN means native forest regrowth thinning operations in which even age regeneration coupes are thinned.

TTF means Tamar Tree Farms was a partnership with Mitsubishi Corporation, Mitsubishi Paper Mills Ltd and Tokyo Electric Power Company.

TTT means Tasmanian Tree Trust which was similar to a managed investment scheme for which Forestry Tasmania was the management contractor.

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