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FACT SHEET 7

# Private Native Forestry

Tree Alliance

# Financial analysis for private native forestry

**Tasmania's extensive private native forests have a long history of active management for timber production. With our changing climate and an expanding bioeconomy, Private Forests Tasmania has identified strong opportunities to boost the health and resilience of these forests, while generating income and other ecosystem benefits through silvicultural treatments such as thinning. This private native forest management series is designed to assist forest owners to successfully plan and carry out active management for beneficial outcomes. It includes fact sheets on relevant topics, a detailed how to guide and case studies demonstrating how active management techniques are being applied to achieve various land management and financial objectives in five private native forests.**

## Introduction

Financial analysis is a key step in preparing to conduct a silvicultural treatment such as native forest thinning. It assists in estimating returns from an operation under a given scenario, enables analysis of the potential and comparative profitability between different options and generally puts the forest owner in a more informed position during planning and contract negotiations. This fact sheet introduces the principles of financial analysis for native forestry operations. It identifies the types of information required and presents analysis of several scenarios which demonstrate the influence of a range of variables on operational financial outcomes. The information presented is derived from modelled scenarios and does not represent the outcomes for any of the specific case studies described in this series.

Native forest harvesting produces revenue from logs

## Types of financial analysis

There are two basic approaches to financial analysis of native forestry activities. First is the analysis of operational cash flows for a specified activity at a point in time. Second is the analysis of the impact of operational activities on future cashflows which are adjusted for inflationary factors (discounted cash flow analysis).

## Information requirements

Reliable financial analysis and forecasting requires good quality information inputs about the forest, the proposed operations and potential sales. At a high level, the information required is as simple as costs and revenues based on information such as:

- The area of forest to be harvested (excluding any areas to be retained and unproductive areas).
- An estimate of the standing volume, proportion of product grades and growth rate of the forest.
- Costs associated with the operation including professional advice, planning costs, regulatory approvals, levies, road and landing construction, harvest and haulage.
- Ongoing management costs such as firebreak, road and fence maintenance, council rates, invasive species control and insurance.
- Prices for forest products.

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## Sales methods

The point along the supply chain where the forest products will be sold will dictate how much influence a landowner has over the costs and revenues received. In simple terms, forest products are usually purchased in the forest (stumpage), at the roadside or at the processing facility (delivered sales). They may be purchased directly by the customer, or by an intermediary. Alternatively, the landowner may engage an agent for a fee to assist with managing the harvest and selling the forest products. Regardless of the sales method, it is useful for the landowner to understand the costs and returns that are likely to apply so that they are fully informed about the operation. If the forest owner is considering a potential stumpage sale, the only costs associated with the operation for the owner will be for professional advice to assist the negotiation of the sales contract. In this example the purchaser wears all operational costs and subtracts these from the price offered for the forest products. Where the forest owner manages the harvest and haulage operation and is paid for delivered products, all costs will need to be included in the financial analysis.

Further information about developing these inputs is available in *Fact Sheet 3 – Getting Harvest Ready*, and in the associated publication: *A guide to private native forest operations in Tasmania*.

## Operational cash flow analysis

Operational cash flow analysis is used to assist in determining the total costs and returns of a specified activity at a point in time, and whether it will be profitable. Operational cash flows will be influenced by factors such as distance to market, terrain, condition of existing roads and how much wood of different grades (for example sawlog and pulp log) will be produced. Even if the landowner is being paid a stumpage for the logs produced, a basic understanding of the way in which the stumpage price is calculated will provide a greater degree of confidence about the operation and its financial profile.

To demonstrate this, four scenarios are presented which provide an indicative financial analysis for native forest regrowth thinning operations in a range of conditions and situations. The variables which are considered in these scenarios include harvest area, sawlog quality and price, sawlog to pulp log ratio, distance to market, harvest and haulage difficulty, roading costs and fees for planning and advice.

## SCENARIO 1

Scenario 1 models a high quality private native forest comprising preferred species and high volumes, a high sawlog to pulp log ratio, and proximity to markets. Harvest difficulty is moderate and haulage difficulty is low, roads are established and in moderately good condition. The harvest area is 100 hectares. The thinning activity is modelled to deliver an average $35.23/m^3$ stumpage and $3,834 per hectare.

| INPUT VARIABLES | |
|---|---|
| Harvest area (ha) | 100 |
| **Revenue variables** | |
| Standing volume ($m^3$/ha) | 225 |
| Sawlog harvest volume ($m^3$/ha) | 13.6 |
| Pulp log harvest volume ($m^3$/ha) | 76.4 |
| Sawlog delivered price ($/$m^3$) | 170.00 |
| Pulp log delivered price ($/$m^3$) | 70.00 |
| **Cost variables** | |
| Distance to sawmill (km) | 52 |
| Distance to chip mill (km) | 33 |
| Haulage difficulty | Low |
| Haulage costs ($/$m^3$/km) | 0.15 |
| Harvest difficulty | Moderate |
| Harvest costs ($/$m^3$) | 32.00 |
| Planning, levies and advice ($) | 12,000.00 |
| Marketing ($/$m^3$) | 1.80 |
| Roads and landings ($/$m^3$) | 2.00 |

| HARVEST RETURN CALCULATION | | | |
|---|---|---|---|
| **Item** | **$/$m^3$** | **$/ha** | **$ total** |
| Planning, levies and advice | 1.33 | 120 | 12,000 |
| Marketing | 1.80 | 162 | 16,200 |
| Roads and landings | 2.00 | 180 | 18,000 |
| Harvest | 32.00 | 2,880 | 288,000 |
| Haulage | 12.75 | 484 | 48,426 |
| **Total costs** | **49.88** | **3,826** | **382,626** |
| Sawlog | 170.00 | 2,312 | 231,200 |
| Pulp log | 70.00 | 5,348 | 534,800 |
| **Total revenue** | **85.11** | **7,660** | **766,000** |
| **Net revenue (profit)** | **35.23** | **3,834** | **383,374** |

| Net stumpage ($/ha) | |
|---|---|
| Sawlog | 120.12 |
| Pulplog | 20.12 |
| All products | 35.23 |

## SCENARIO 2

Scenario 2 shows the modelling for a poor quality forest producing only pulp log at low volumes. The block is a moderate to high distance from market. However, harvest and haulage difficulty is low and roading is in good condition. Therefore, the operation still produces a net return of $10.03/m^3$ and $361 per hectare (driven by low volumes), while also improving future forest productivity.

| INPUT VARIABLES | |
|---|---|
| Harvest area (ha) | 50 |
| **Revenue variables** | |
| Standing volume ($m^3$/ha) | 90.00 |
| Sawlog harvest volume ($m^3$/ha) | - |
| Pulp log harvest volume ($m^3$/ha) | 36.00 |
| Sawlog delivered price ($/$m^3$) | - |
| Pulp log delivered price ($/$m^3$) | 70.00 |
| **Cost variables** | |
| Distance to sawmill (km) | - |
| Distance to chip mill (km) | 120.00 |
| Haulage difficulty | Low |
| Haulage costs ($/$m^3$/km) | 0.15 |
| Harvest difficulty | Low |
| Harvest costs ($/$m^3$) | 32.00 |
| Planning, levies and advice ($) | 12,000.00 |
| Marketing ($/$m^3$) | 1.80 |
| Roads and landings ($/$m^3$) | 1.50 |

| HARVEST RETURN CALCULATION | | | |
|---|---|---|---|
| **Item** | **$/$m^3$** | **$/ha** | **$ total** |
| Planning, levies and advice | 6.67 | 240 | 12,000 |
| Marketing | 1.80 | 65 | 3,240 |
| Roads and landings | 1.50 | 54 | 2,700 |
| Harvest | 32.00 | 1,152 | 57,600 |
| Haulage | 18.00 | 648 | 32,400 |
| **Total costs** | **59.97** | **2,159** | **107,940** |
| Sawlog | 0.00 | - | - |
| Pulp log | 70.00 | 2,520 | 126,000 |
| **Total revenue** | **70.00** | **2,520** | **126,000** |
| **Net revenue (profit)** | **10.03** | **361** | **18,060** |

| Net stumpage ($/ha) | |
|---|---|
| Sawlog | - |
| Pulplog | 10.03 |
| All products | 10.03 |

## SCENARIO 3

In scenario 3, while the volume is reasonably high, the sawlog species are non-preferred which impacts delivered value. In addition, existing roads require considerable maintenance and repair work and harvest and haulage difficulty is high. Consequently, the pulp log is harvested at a loss which reduces overall profitability to $15.69/$m^3$ and $2,107 per hectare. However, because the road issues have been dealt with it is likely that the next harvest event will be profitable for all log categories.

| INPUT VARIABLES | |
|---|---|
| Harvest area (ha) | 75 |
| **Revenue variables** | |
| Standing volume ($m^3$/ha) | 170.00 |
| Sawlog harvest volume ($m^3$/ha) | 17.00 |
| Pulp log harvest volume ($m^3$/ha) | 51.00 |
| Sawlog delivered price ($/$m^3$) | 150.00 |
| Pulp log delivered price ($/$m^3$) | 70.00 |
| **Cost variables** | |
| Distance to sawmill (km) | 79.00 |
| Distance to chip mill (km) | 85.00 |
| Haulage difficulty | Hard |
| Haulage costs ($/$m^3$/km) | 0.19 |
| Harvest difficulty | Hard |
| Harvest costs ($/$m^3$) | 36.00 |
| Planning, levies and advice ($) | 12,000.00 |
| Marketing ($/$m^3$) | 1.80 |
| Roads and landings ($/$m^3$) | 3.00 |

| HARVEST RETURN CALCULATION | | | |
|---|---|---|---|
| **Item** | **$/$m^3$** | **$/ha** | **$ total** |
| Planning, levies and advice | 2.35 | 160 | 12,000 |
| Marketing | 1.80 | 122 | 9,180 |
| Roads and landings | 3.00 | 204 | 15,300 |
| Harvest | 36.00 | 2,448 | 183,600 |
| Haulage | 31.16 | 1,079 | 80,912 |
| **Total costs** | **74.31** | **4,013** | **300,992** |
| Sawlog | 150.00 | 2,550 | 191,250 |
| Pulp log | 70.00 | 3,570 | 267,750 |
| **Total revenue** | **90.00** | **6,120** | **459,000** |
| **Net revenue (profit)** | **15.69** | **2,107** | **158,009** |

| Net stumpage ($/ha) | |
|---|---|
| Sawlog | 75.69 |
| Pulplog | 4.31 |
| All products | 15.69 |

## SCENARIO 4

In scenario 4, the available volume is moderately high and comprises non-preferred sawlog species of poor quality. Harvest difficulty is low and haulage difficulty is moderate. A key consideration is that because of the small area of the forest to be harvested, fixed costs such as planning and advice have a greater impact on net returns. The operation returns $14.07/m^3$ and $1,479 per hectare.

| INPUT VARIABLES | |
|---|---|
| Harvest area (ha) | 25 |
| **Revenue variables** | |
| Standing volume ($m^3$/ha) | 140.00 |
| Sawlog harvest volume ($m^3$/ha) | 10.00 |
| Pulp log harvest volume ($m^3$/ha) | 46.00 |
| Sawlog delivered price ($/$m^3$) | 135.00 |
| Pulp log delivered price ($/$m^3$) | 70.00 |
| **Cost variables** | |
| Distance to sawmill (km) | 71.00 |
| Distance to chip mill (km) | 80.00 |
| Haulage difficulty | Moderate |
| Haulage costs ($/$m^3$/km) | 0.17 |
| Harvest difficulty | Low |
| Harvest costs ($/$m^3$) | 30.00 |
| Planning, levies and advice ($) | 12,000.00 |
| Marketing ($/$m^3$) | 1.80 |
| Roads and landings ($/$m^3$) | 1.50 |

| HARVEST RETURN CALCULATION | | | |
|---|---|---|---|
| **Item** | **$/m³** | **$/ha** | **$ total** |
| Planning, levies and advice | 8.57 | 480 | 12,000 |
| Marketing | 1.80 | 101 | 2,520 |
| Roads and landings | 1.50 | 84 | 2,100 |
| Harvest | 30.00 | 1,680 | 42,000 |
| Haulage | 25.67 | 746 | 18,658 |
| **Total costs** | **67.54** | **3,091** | **77,278** |
| Sawlog | 135.00 | 1,350 | 33,750 |
| Pulp log | 70.00 | 3,220 | 80,500 |
| **Total revenue** | **81.61** | **4,570** | **114,250** |
| **Net revenue (profit)** | **14.07** | **1,479** | **36,973** |

| Net stumpage ($/ha) | |
|---|---|
| Sawlog | 67.46 |
| Pulplog | 2.46 |
| All products | 14.07 |

Good quality financial analysis for forestry operations helps the whole farm

## Discounted cash flow analysis

Forest management is a long-term activity, and because returns on investment may not be realised for many years, financial analysis for forestry must consider the effects of inflation on future returns. The most common approach adopted for financial analysis in forestry is the application of a discounted cash flow (DCF) analysis. A cash flow, factoring in all anticipated operational cost inputs and sales revenues, is developed for the operation over a set time period. A discount rate is selected which represents the anticipated long-term effects of inflation and risk on the future dollar value. The discount rate is applied to the cashflow to calculate overall returns on the investment at today's value (net present value). The net present value (NPV) can be calculated for a single hectare and extrapolated across the whole forest.

Discounted cashflow analysis to develop a net present value is a useful tool for assessing the comparative merits of alternative management strategies over a long period of time. Extending on the regrowth thinning scenarios outlined above, the example below uses DCF to compare the relative benefits to a landowner of undertaking a long-term program of regrowth thinning compared to a single future clearfell event.

| **Forest description** | |
|---|---|
| Harvest area (ha) | 100 |
| Clearfell year | 1973 |
| Standing volume ($m^3$/ha) | 225 |
| Distance to sawmill (km) | 33 |
| Distance to chip mill (km) | 52 |

| **Costs** | |
|---|---|
| Planning, levies, advice ($) | 12,000 |
| Marketing ($/$m^3$) | 1.80 |
| Roads and landings ($/$m^3$) | 2.00 |
| Harvest ($/$m^3$) | 32.00 |
| Haulage ($/$m^3$/km) | 0.15 |
| Annual costs ($/ha/yr) | 225 |

| **Revenue** | |
|---|---|
| Sawlog delivered price ($/$m^3$) | 170 |
| Pulp log delivered price | 70 |
| Discount rate (post tax) | 8% |

| **Thinning strategy** | |
|---|---|
| Thinning years | 1 (regrowth age 51) + regeneration<br>16 (regrowth age 66)<br>50 (regeneration age 50) |
| MAI ($m^3$/ha/yr) | 1.5 (Years 1-16)<br>1.8 (Years 16-50) |
| Sawlog ($m^3$/ha) | 13.6 (Year 1)<br>56.2 (Year 16)<br>38.6 (Year 50) |
| Pulp log ($m^3$/ha) | 25.8 (Year 1)<br>37.4 (Year 16)<br>38.6 (Year 50) |
| **Net present value ($)** | **576,000** |

| Clearfell strategy | |
|---|---|
| Clearfell year | 35 (age 86) |
| MAI ($m^3$/ha/yr) | 0.7 |
| Sawlog ($m^3$/ha) | 91.0 (Year 35) |
| Pulp log ($m^3$/ha) | 158.5 (Year 35) |
| **Net present value ($)** | **398,500** |

The analysis in this instance demonstrates a significant difference between net present value for the thinning strategy when compared to the clearfell strategy, providing a strong financial justification for pursuing that course of action.

## References

**Fact Sheet 1:** Commercial management of private native forests

**Fact Sheet 2:** Getting harvest ready

**Fact Sheet 3:** Native forest silviculture

**Fact Sheet 5:** Timber products, markets and supply chains for private native forests

**Fact sheet 6:** Risk management for private native forests



## More information

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Tasmania is one of the best places in the world to manage forests for sustainable and profitable outcomes. To learn more about your options for renewable native forest management, contact the team at Private Forests Tasmania on their Tree Alliance hotline or through their general enquiries.

Private Forests Tasmania — Tree Alliance

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