Private native forest management

Wide Bay Burnett

Private native forest (PNF) is natural forest or woodland that is privately owned and usually contains tree species with some commercial value for timber. These forests are typically dominated by hardwood eucalypt species.

The Wide Bay Burnett region extends from just south of Rockhampton in the north to Maleny in the south and Cracow in the west. It includes the local government areas of Gladstone, Bundaberg, North Burnett, Fraser Coast, South Burnett, Gympie, Noosa and part of Sunshine Coast, Somerset and Western Downs. (Figure 1).

The region is defined by catchment boundaries and covers approximately 6.3 million hectares.

Private native forests are an important component of regional communities and contribute at least half of the log supply to the hardwood industry. In the Wide Bay Burnett region 21 sawmills rely on a combination of private and state-sourced hardwood timber, with several more mills located in adjacent areas.

Some of the private native forests in this region are managed for timber and livestock grazing.

These forests also have important environmental values and support a diversity of plant and animal species.

Forest types

The most common types of private native forest in the region are open forests and woodlands dominated by spotted gum and ironbarks.

They also commonly include bloodwood species, other gum eucalypts and stringybark species.

Open forests and woodlands are distinguished by tree height, canopy cover and understorey structure (Table 1).

<table>
<thead>
<tr>
<th>Forest types</th>
<th>Open, eucalypt forests</th>
<th>Open woodland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mature stand height</td>
<td>10–30 m</td>
<td>15–25 m</td>
</tr>
<tr>
<td>Canopy cover</td>
<td>50–80%</td>
<td>20–50%</td>
</tr>
<tr>
<td>Understorey</td>
<td>Grassy with a sparse shrub layer</td>
<td>Grasses and herbs</td>
</tr>
</tbody>
</table>

Five forest types make up 80% of the area of potentially harvestable forests in the Wide Bay Burnett region (Table 2).

The remaining 20% includes smaller areas of a mix of other, potentially harvestable forest types.
Figure 1. Potentially harvestable private native forest in the Wide Bay Burnett region.

Map based on Landsat Foliage Projective Cover, Queensland 2014. Remote Sensing Centre, Department of Science, Information Technology and Innovation.
There are 1,005,300 hectares of potentially harvestable private native forest in the Wide Bay Burnett region.

Mapped private native forest areas are based on regional ecosystems that are potentially harvestable under the Native Forest Code (the Code). The areas are based on expert knowledge of harvestable forest types (Figure 1, Table 3).

The area is a minimum area, because it does not include more open woodlands. The mapped area does not reflect the area currently managed for timber production.

Most private native forest occurs in areas mapped as remnant forest (Table 3). Timber production is permitted in both remnant and regrowth forest, according to the Code.

Areas mapped as woody, non-remnant forest do not need to be managed with reference to the Code.

Note that mapped, potentially harvestable private native forest may include some areas that have little or no commercial timber value.
Grazing and timber production

Grazing

Most privately owned native forest in the region is grazed by cattle. Grazing is concentrated on established pastures, largely cleared of trees, and usually in valleys and on the lower slopes where soils are more productive.

Grazing under native forests is less productive than on open pastures because trees compete with pasture growth. In addition, private native forests often occur on steeper slopes and ridges, on less fertile soils with low water holding capacity. This means that grazing under forests occurs at lower stocking rates (i.e. number of cattle per hectare). However, because forests cover an extensive area in the region, they remain an important grazing resource.

Prescribed fire is often used to control woody understorey species (e.g. lantana) and to encourage grass growth in these forests. Management practices such as fire and thinning determine the relative proportions of tree and grass cover.

Actively managing the native forests on a property has the potential to return multiple benefits to the landholder, particularly in the form of a dual income stream and improved environmental outcomes.

Timber

Private native forests offer benefits in timber production, particularly when the forest has been managed to promote the growth of merchantable trees. A range of timber products may be harvested, including sawlogs, poles, piles, girders, fencing and landscaping materials.

Private native forests typically contain a mix of tree sizes and ages. Harvesting commercial-size trees usually involves selective tree removal. This creates minimal disturbance and the additional space promotes growth of the remaining trees.

Forest productivity

Forest productivity refers to the stand’s capacity to produce wood products of commercial value. Generally, well managed forests contain a higher proportion of merchantable stems.

Many private native forests are not in an optimum state for timber production because they have a history of poor management.

In many cases, all the trees with potential value are removed at a single harvest, leaving a high proportion of non-commercial (unmerchantable) trees in the stand and reducing the forest's productive value. This practice is referred to as ‘high-grading’; it results in an increase in the proportion of unmerchantable trees over time.
In addition, many private native forests are regrowth forests with a high number of small trees. Intense competition between the trees reduces growth. Silvicultural treatment, or thinning the forest, reduces the number of small trees, which encourages growth of the remaining, higher value stems and merchantable volume. Thinning is also used to remove non-commercial species, stems that are too close together, stems with poor form (i.e. not straight) and stems with defects such as large fire scars. Thinning results in a higher proportion of merchantable trees left in the stand. In remnant forest, thinning should follow the Code to ensure an appropriate number of ‘habitat trees’ are retained. Currently, silvicultural thinning is rarely practiced in the region and many private native forests have a high number of smaller-sized trees (Figure 2). More than 50% are unmerchantable trees that could be thinned.

**Merchantable volume and carbon stocks**

The site productivity of a stand determines the rate of biomass accumulation and the amount of biomass and carbon that can be stored (Figure 3). Sound forest management practices (e.g. with thinning) will maximise carbon sequestration and volume growth on merchantable trees. Carbon sequestered in the forest can be stored in manufactured wood products that go into service.

**Figure 3** shows:
- the average **merchantable volume** (calculated for trees with DBH of at least 30 cm) and
- the amount of **above-ground tree carbon** stored in forest stands in the Wide Bay Burnett region.

The figures are from surveys of 25 properties.

**Merchantable volume:** the volume (m$^3$) of wood in the bole of the tree that would be removed during a harvest.

**Above-ground tree carbon stock:** carbon stored in all the above-ground parts of the tree (both the bole of the tree and the canopy).

**Merchantable volume growth:** the rate of wood volume accumulation in a tree (m$^3$/year) or stand (m$^3$/ha/year) over a period of time.

**Treated stand:** a stand that has been thinned to encourage higher growth rates on remaining stems.

**Untreated stand:** a forest stand that has not been thinned.

Prescribed burning is also an important management tool that encourages or controls regeneration, maintains forest health and protects valuable timber resources.
Improving forest productivity

Landholders can improve the productivity of their forest by investing in silvicultural treatment to reduce the number of small, unproductive stems.

Data comparing treated and untreated stands (Table 4) show that:

- Untreated stands have a higher density of stems because they have not been thinned.
- The proportion of merchantable trees is higher in treated stands than in untreated stands.
- The rate of DBH and merchantable volume growth is also greater in treated stands.

Table 4. Productivity compared between treated and untreated stands: Trial plot data assessed over time and averaged to determine the influence of thinning treatments.

<table>
<thead>
<tr>
<th>Treated stand</th>
<th>Untreated stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>154</td>
<td>350</td>
</tr>
<tr>
<td>Total stems with DBH ≥10 cm/hectare</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>23</td>
</tr>
<tr>
<td>Merchantable stems (%)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>77</td>
</tr>
<tr>
<td>Unmerchantable stems (%)</td>
<td></td>
</tr>
<tr>
<td>0.8</td>
<td>0.2</td>
</tr>
<tr>
<td>DBH growth on all stems (cm/year)</td>
<td></td>
</tr>
</tbody>
</table>

The large area of private native forest in the Wide bay Burnett region has great potential for improving forest productivity through silvicultural treatment.

Improving forest productivity will increase the proportion of merchantable stems in a stand that are available for future harvests to supply the timber industry.
Ecological benefits and condition

Private native forests provide many ecological benefits including valuable habitat for native plant and animal species. They provide connectivity across the landscape and help to protect examples of some ecosystem types under-represented in conservation reserves.

Indicators of ecosystem function or health measured in these forests contribute to an understanding of their ecological condition.

Attributes such as the number of large trees, tree and shrub cover and regeneration, perennial grass cover and woody debris were scored against benchmarks for specific ecosystems in the region.

These attributes (defined in the BioCondition manual[3]) are used to calculate an ecological condition score based on benchmark values for relevant forest types (Table 5).

Table 5. Ecological attributes of private native forest in the Wide Bay Burnett region.

<table>
<thead>
<tr>
<th>Ecological attributes</th>
<th>Native forest Wide Bay Burnett</th>
<th>Benchmark Wide Bay Burnett</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large trees / hectare</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Tree cover (%)</td>
<td>51</td>
<td>52</td>
</tr>
<tr>
<td>Regeneration of canopy species (%)</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>Shrub cover (%)</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>Grass cover (%)</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Weed cover (%)</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Litter cover (%)</td>
<td>66</td>
<td>44</td>
</tr>
<tr>
<td>Woody debris (linear metres)</td>
<td>675</td>
<td>420</td>
</tr>
</tbody>
</table>

A managed stand of regrowth forest in the Wide Bay Burnett region.
Ecological condition score

The score for private native forest ecological condition is calculated using the BioCondition benchmarks relevant to forest types in this region.

When scoring BioCondition, ‘condition’ refers to the degree to which the attributes of a patch of forest differ from the attributes of the same forest in its reference state or benchmark.

Scores for private native forest in the Wide Bay Burnett region represent regrowth and remnant forest. In general, remnant forests have a higher score (often >80) than regrowth forests.

A diverse and functioning ecosystem has scores between 80 and 100.

36% of the Wide Bay Burnett region scores are in the Class 1 range and the average score is 77 (Figure 4). The remaining sites have scores in Class 2, so are in good condition.

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Cleared areas tend to have very low BioCondition scores, so most private native forests in this region have ecological benefits not found in the adjacent, cleared areas. As regrowth forests mature, they contain more ‘large trees’, which will improve the BioCondition score at some sites.

Managing forests for timber production, with silvicultural treatment for example, will improve the growth of larger trees. It may also encourage perennial grass cover, which should improve the BioCondition score over time.

More information

1. The Vegetation of Queensland. Descriptions of Broad Vegetation Groups, Department of Science, Information Technology and Innovation


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