

SFM Western Australia Limestone Forest Management Unit (SFM-WAL-FMU)

Water Impact Assessment

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SFM acknowledges the traditional custodians of the land which we manage.

We show respect to their culture and their elders who have managed the land in the past.

REVISION AND APPROVAL

This document will be reviewed whenever significant changes occur.

Version	Changes	Date
V1	Draft document	28 Feb 2018
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V3	Updated for NFSS	16 Sep 2019
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Approved for use: Andrew Morgan Managing Director	
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1 Introduction

SFM Environmental Solutions Pty Ltd (SFM) is the appointed Property Manager for the Limestone Plantations *Eucalyptus globulus* (Blue Gum) assets located in the south west of Western Australia (WA).

This document provides a water impact assessment for the Western Australian Limestone Forest Management Unit (SFM-WAL-FMU).

2 Hydrological flows and catchment management goals

The Limestone Plantations in Western Australia are located within two NRM Regions, the South West NRM region and the South Coast NRM region. The South West Catchments Council Inc is responsible for catchment management in the South West Region, and the relevant catchment management authorities for Limestone Plantations in the South Coast NRM region are the South Coast NRM, and the Wilson Inlet Catchment Committee and Oyster Harbour Catchment Group.

2.1 South West NRM Region

The South West Catchments Council Inc (SWCC) is made up of five Basins. The Peel-Harvey Catchment Council has recently become its own regional NRM body and is not included in the SWCC (see Figure 1):

- Leschenault (4,808 sq km);
- Geographe (2,000 sq km);
- Cape to Cape (1,048 sq km);
- Blackwood (23,500 sq km);
- Warren (9,500 sq km).



Figure 1. Boundary of the SWCC sub regions/basins (**Source:** [South West NRM Strategy](#))

One property in the Limestone Plantations, Lucknow, is located in the Blackwood Basin. The Blackwood Basin covers approximately 23,500 square kilometers, extending from the coast at Augusta, and eastwards to the Shire of Boyup Brook, the Shire of Woodanilling, and the Shire of Dumbleyung. The Blackwood Basin, due to its size and variation in rainfall has been split into three areas, Lower Blackwood, Middle Blackwood, and Upper Blackwood. The relevant area to Limestone Plantations is the Middle Blackwood Basin which contains the towns of Bridgetown, Greenbushes and Boyup Brook (see Figure 2).

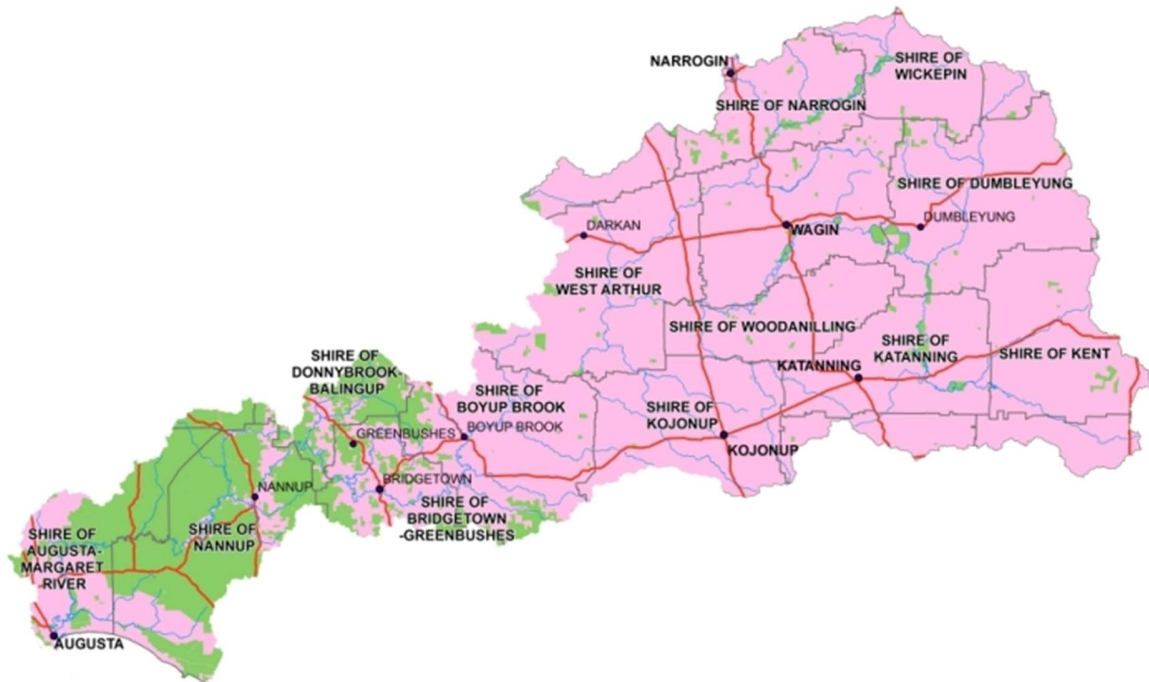


Figure 2. Boundary of the Blackwood Basin (**Source:** [South West NRM Strategy](#))

2.2 South Coast NRM Region

The South Coast NRM Region is split into seven sub regions (Figure 3). Five of the Limestone Plantations sit within the Albany Hinterland region which contains three catchments:

- Wilson Inlet (2,254 sq km);
- Oyster Harbour (3,000 sq km);
- Eastern Hinterland (approximately 2,300 sq km).



Figure 3. South Coast NRM Sub Regions (Source: [South Coast NRM](#))

One property, Maringa West, occurs in the Wilson Inlet Catchment. This catchment covers approximately 2,254 square kilometers and includes 4 main river and creek systems that feed into the inlet which include Denmark, Hay, Sleeman, and Little Rivers and the Cuppup creek (see Figure 4).



Figure 4. Boundary of the Wilson Inlet Catchment (Source: [Wilson Inlet Catchment Committee](#))

Three properties occur in the Oyster Harbour Catchment. This catchment is approx. 3,000 square kilometers in size and stretches from Albany in the south to Tenterden in the north (Figure 5).



Figure 5. Boundary of the Oyster Harbour Catchment (**Source:** [The Oyster Harbour Catchment Group Inc.](#))

The remaining property, Cheynes (East and West), occurs in the Albany Eastern Hinterland catchment which is approximately 2,300 square kilometres in size and bounded by the Stirling Ranges in the north, the Pallinup River in the east, the coast to the south, and the Oyster Harbour Catchment to the west (see Figure 6). Included in the catchment are the towns of Manypeaks, South Stirlings, and Wellstead. There are no major rivers in the area but various smaller rivers draining towards the coast including the Waychinicup, Cordinup and Eyre Rivers. Most of the area is internally drained to lakes or swamps.

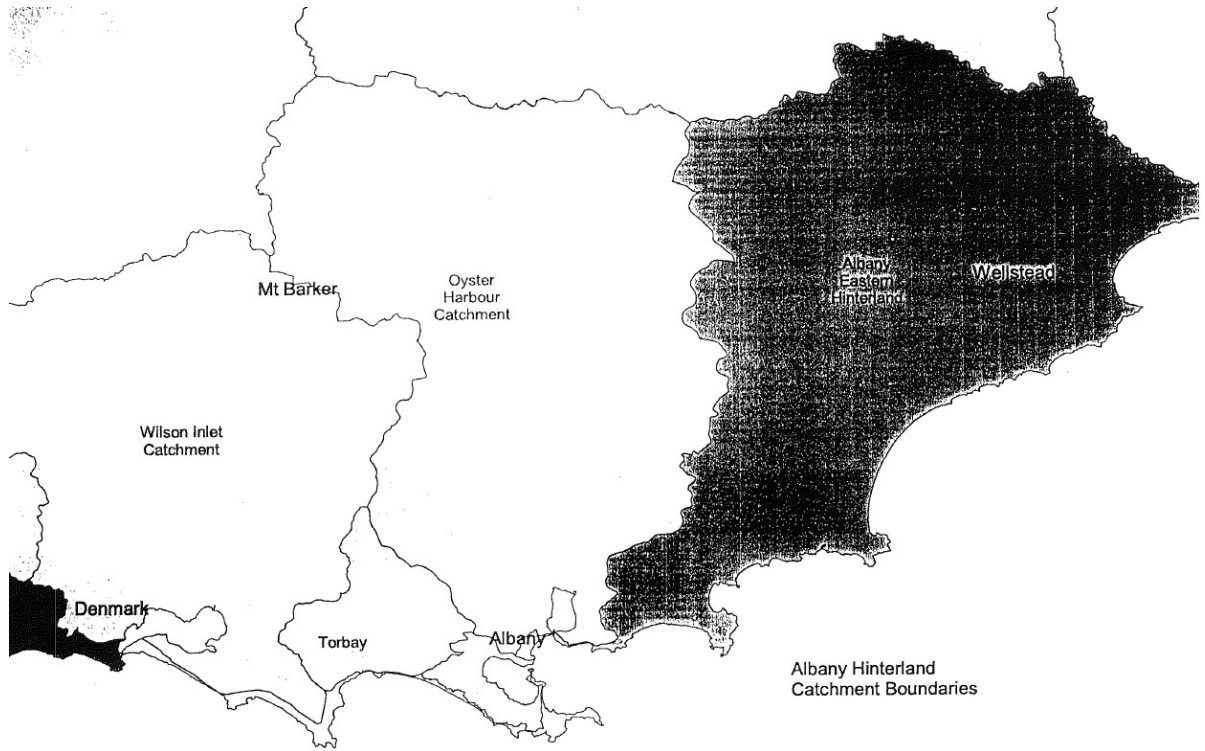


Figure 6. Boundary of the Albany Eastern Hinterland Catchment (**Source:** [Inventory of sub-catchments within the Albany eastern hinterland](#))

3 Plantations and Water Use in WA

In June 2009, the Department of Water in WA released a document called "Plantation forestry and water management guideline". This guideline suggests that negative impacts of plantation forestry on water are:

- Plantation forestry is a significant water resource management issue and can result in less groundwater and stream flow.
- Plantations can trigger the release of sulfuric acid and metals from soils into streams.

Positive effects of plantation forestry are:

- Reduces stream salinity
- Reduces the effects of soil salinity on plant growth

The 2007 publication titled [Plantations and Water Use](#) by Parsons *et al.* identified that the effects of industrial plantations on water yield can potentially be minimised by four factors:

- Targeting new plantation establishment in lower rainfall areas (<800 mm/year) where reductions in water yields are smaller.

The majority of the WA plantations in the Limestone Plantations estate are in areas with annual rainfalls from 650mm to 880mm (see Appendix 2)

- Dispersing plantations across the landscape and keeping them to less than 20% of a catchment.

Properties within the SFM-WAL-FMU range from 106ha to 732ha, with an average area of 407.6ha. They are dispersed across different sub-catchments (see Appendices 2). The maximum area of SFM-WAL-FMU land contained within a catchment (Oyster Harbour) is 0.5%.

- Phasing planting to give a spread of age classes; and

The WA Limestone Plantations consist of an extremely small area spread across four different catchments therefore phasing planting will make no difference to the impacts on water.

- Thinning plantations to maintain them at a lower stocking density.

Blue gum plantations grown over short rotations for pulp wood production cannot be economically thinned. Work being undertaken in Tasmania to grow Blue gum plantations over 25-year sawlog/peeler log regimes may flow through to the WA with time, resulting in potential opportunities for commercial thinnings to be utilised in some stands. Coppiced stands are thinned on time to ensure that water use is optimised.

4 Waterway Strategies

In Western Australia, there are several water management bodies regulating different aspects of water, however primary responsibility falls to the Department of Water and Environmental Regulation (DWER). DWER manage water and environmental issues at a high level, while Regional Natural Resource Management Groups (NRM's) manage water at a finer scale.

Western Australian catchments are split into seven not-for-profit Regional Natural Resource Management Groups, primarily funded to deliver the National Landcare Programme. Each group has developed a regional strategy and investment plan that addresses significant NRM issues within their region. The relevant NRM Groups to the SFM-WAL-FMU are the South West Catchment Council (SWCC) for the South West Region, and the South Coast NRM Inc for the South Coast NRM Region. The Oyster Harbor Catchment Group Inc & the Wilson Inlet Catchment Committee also contribute to specific catchment management goals for the South Coast NRM Inc.

4.1 South West Region

The SWCC Regional NRM Strategy 2014 is the key strategy for the South West Region. It provides a strategic framework for the future management, protection, rehabilitation and improvement of the region's natural resources. The vision articulated in the strategy is - **“Our natural environment will be dynamic, bio-diverse, productive and resilient. It will be adapting and thriving. As a community, we will balance productive use with the protection of our natural environment, and recognise and retain inherent environmental values for the benefit of future generations.”**

To achieve the vision, six priority areas for action were developed:

- Terrestrial biodiversity
- Aquatic biodiversity
- Water resources
- Land resources
- Coasts and the marine environment
- Communities and culture

The SWCC overall objective for the water resources priority area is - **“To contribute substantially to the conservation and management of targeted water resources in the South West NRM region to ensure that they remain healthy and productive.”** The SWCC developed overall outcome indicators to test whether this objective is achieved. They are:

- Maintain or improve the ecosystem functions of the region's targeted surface water resources in the period up to 2020.
- Maintain or improve the quantity and quality of the region's targeted ground water resources in the period up to 2020.

- Maintain or improve the quality, and decrease the quantity, of the region's urban water run-off in the period up to 2020.
- Maintain or improve the levels of use of the region's targeted water resources in the period up to 2020.
- The risks associated with climate variability on the region's targeted water resources are incorporated into water management in the period up to 2020.

There is only one property in the SFM-WAL-FMU that is within the South West Region. This property, Lucknow, does not have any drainage flows (see Appendix 2) that impact on priority estuaries, rivers, or wetlands.

4.2 South Coast Region

The South Coast NRM Inc aspires **“To ensure our region's rivers, estuaries, wetlands and water resources are maintained, protected, and/or restored with social, cultural, economic and ecological values recognised and embraced.”** within the next 25+ years. This will be achieved by:

- Maintain and/or improved condition of low impacted (near pristine) and impacted (degraded) wetlands, waterways and estuaries.
- Protect and/or improve habitats, ecological function and biodiversity of rivers, estuaries wetlands and their foreshores.
- Prevent or minimise degradation (eutrophication, erosion, sedimentation, salinisation and changed hydrological regimes) of waterways.
- Identify and protect regionally, nationally and internationally significant wetlands.
- Improve understanding and awareness of the values, attributes and management needs of wetlands and waterways.
- Maintain and/or improve quality and sustainable, efficient use of water resources.
- Maintain and/or improve recreational, cultural, commercial (including fishing) and social amenity values of estuaries, rivers and foreshores.

In addition to this, the South Coast NRM Inc. has developed some clear goals to achieve within the next 10+ years:

- **Goal W1: Waterway health: low impacted or pristine rivers, estuaries and wetlands:** Maintain and/or improve values and reduce threats to low impacted water resources by 2030 using quantifiable targets reviewed by 2012.
- **Goal W2: Waterway health:** impacted or degraded rivers, estuaries and wetlands: Maintain and/or improve values and reduce threats to priority impacted rivers, estuaries and wetlands by 2030, using quantifiable targets reviewed by 2012.
- **Goal W3: Water resources:** surface water and groundwater resources: Maintain and/or improve the condition of water resources through

sustainable, efficient use and management to provide water for environmental requirements while meeting the needs of the community and commercial use by 2030, with quantifiable targets reviewed by 2012.

Furthermore, the South Coast NRM Inc. has also set 13 outcomes.

On-ground actions:

- **Outcome W4: Improve condition of impacted or degraded waterways:** Maintain and/or improve condition of priority threatened rivers, estuaries and wetlands with management planning and implementation of best management practices and on-ground works at 25 per cent priority and/or representative systems by 2015.
- **Outcome W5: Protect condition of low impacted or pristine waterways:** Maintain and/or improve condition of high value, less threatened rivers, estuaries and wetlands with management planning and implementation of best management practices and/or on-ground works at 25 per cent priority and/or representative systems by 2015.
- **Outcome W6: Protect wetlands:** Maintain and/or improve the value, level of protection and condition of internationally, nationally and regionally significant wetlands by 2015, with quantifiable targets set based on management plans by 2012.
- **Outcome W7: Improved urban and rural water management:** Reduce impacts from urban, commercial and agricultural sources on water assets across with the implementation of adequate management responses and best management practices by 2015.
- **Outcome W8: Control invasive species:** Reduce the impacts of invasive species in priority riparian zones, including aquatic weeds, feral fish, invasive weeds, feral animals and disease, by the implementation of best management practices by 2015.
- **Outcome W9: Improve water use efficiency:** Improve community use of water resources (efficiency, reuse and reduction) through implementation of initiatives that result in water being valued across the region by 2015.

Capacity Building:

- **Outcome W10: Integration and partnership:** Improve integration and partnership regarding water use and management across all levels of government and the community with the implementation of five cross-organisational projects to achieve sustainable management of water resources by 2015.

- **Outcome W11: Improved education:** Increase knowledge and appreciation of water asset values, enhanced and embraced by the development and implementation of a regional water asset education program and training and knowledge retention initiatives by 2012.
- **Outcome W12: Improve awareness and recognition of significant assets:** Review and raise the awareness of the values of water assets across the region in light of State, national and international frameworks by 2012.

Planning and policy frameworks:

- **Outcome W13: Managed water resources:** Manage water resources sustainably, including surface and groundwater, through adequate planning and management, with support for innovation and efficient use for ecological processes, community and commercial purposes with 80 per cent of water assets secured by 2015.

SFM has assessed the drainage flows for each property in the SFM-WAL-FMU (see Appendix 2), which enables the identification of flows into priority estuaries, river reaches and wetlands. Only one property in the South Coast Region has a drainage/creek system that drains into tributaries leading to the Wilson Inlet.

4.3 SFM management practices

Best management practice for nutrient and sediment management is routinely achieved across all properties in the SFM-WAL-FMU by:

- Re-establishing as soon as possible after harvesting to minimise exposure of bare soil.
- Using a combination of coppicing and seedling established techniques, which minimises soil disturbance across the estate and, in some cases across the property.
- Not using deep ripping of soils for 2nd rotation replanted sites. Existing planting rows are simply re-mounded (where slopes are suitable).
- Optimising the application of fertiliser by taking foliar samples for coppiced plantations to ensure that only required nutrients are delivered.
- Using stream side buffers and drainage to minimise potential for sedimentation and nutrients to move into waterways.
- Working with the relevant catchment management bodies to identify waterway revegetation opportunities.
- Undertaking site visits with government and NGO's to assess wetlands and the options for their restoration.

5 Socio-economic analysis

Australia's total commercial plantation area is approximately 1.77M hectares located within 15 regional hubs. Western Australia is considered a hub for plantation forestry and contributes approximately 309,800 hectares (17%) to the nation's plantation estate, 166,400 hectares of this area is Tasmanian bluegum (9% of national plantation forestry area). 33% of the Tasmanian blue gum hardwood plantations in Australia are in the Western Australia hub.

Plantations provide most of the timber used in Australia to manufacture products for home building, paper and other products. Much of this is processed locally and timber industries are major employers in some regional communities.

The ABARES "[Australian Plantation Statistics and Log Availability 2021](#)" and the Australian Forest Products Association (AFPA) titled "[Plantations – The Missing Piece of the Puzzle](#)" has identified the following facts for the Western Australian hub:

- Total plantation area of 309,800 hectares;
- The major plantation companies in the Western Australian hub are:
 - PF Olsen (PFO)
 - Australian Bluegum Plantations (ABP)
 - Forest Products Commission (FPC)
 - WAPRES
 - Bunbury Fibre Plantations (BFP)
 - Albany Plantation Forest Company (APFL)
- The Forest Products Industry dependent on the resource includes:
 - Wespine (sawmill)
 - WAPRES / Marubeni (woodchip export / port)
 - Bunbury Fibre / Mitsui (woodchip export / port)
 - Laminex (Dardanup) (Particleboard and medium density fibreboard)
 - Albany Plantation Export Company (woodchip export / port)
- The forest industry in these hubs employs 4,500 people.

In the 1st rotation over 23,000 tonnes of wood was harvested from the six properties included in the SFM-WAL-FMU (see Appendix 2), contributing towards economic and social benefits along the harvest and transport supply chain. Tending operations being undertaken across the SFM-WAL-FMU are contributing to sustainable livelihoods for local suppliers and contractors involved in silvicultural activities such as trial measurement, noxious and environmental weed spraying, forest mensuration, and general maintenance operations. SFM's employees, and many local contractors who perform work on the properties in the SFM-WAL-FMU, live or stay in regional towns in the South West/South Coast of Western Australia. The Limestone Plantations estate in Western Australia also

provides for a range of other non-forest values, including affordable building rental and grazing.

6 Bibliography

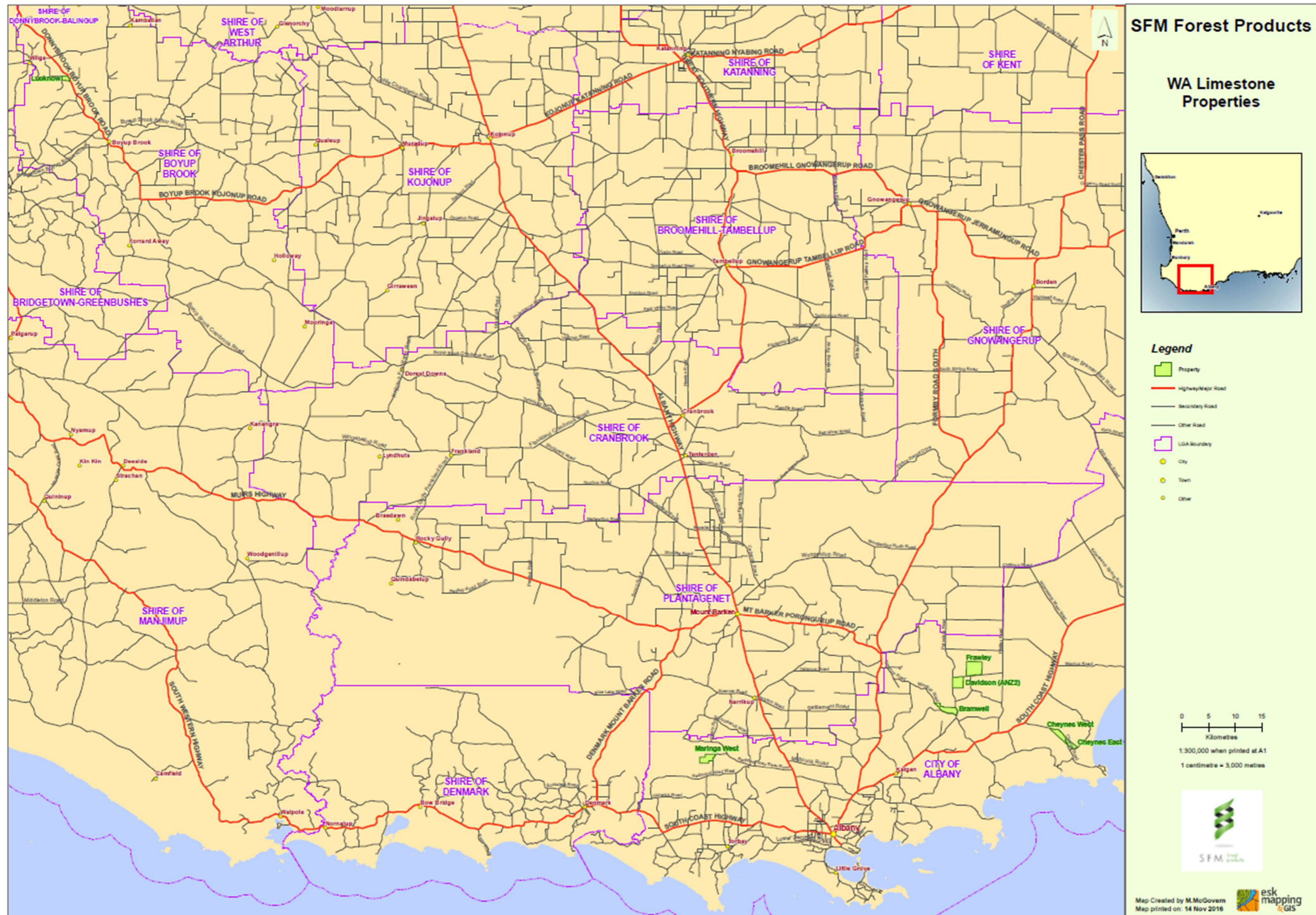
Australian Forest Products Association (2015) [*Plantations – The missing piece of the puzzle*](#). Canberra, ACT (31 pages).

Legg, Frakes and Gavran (2021), [*Australian Plantation Statistics and Log Availability 2021*](#), ABARES, Canberra, ACT (76 pages).

Parsons, Mark, Frakes, Ian and Gerrand, Adam (2007) [*Science for Decision Makers - Plantations and Water Use*](#). Australian Government Bureau of Rural Sciences (12 pages).

Wheeler, Nicholas (2004) [*Chapter 1. Synthesis: a snapshot of the global status and trends in forest biotechnology*](#). In Preliminary review of biotechnology in forestry, including genetic modification. Forestry Department, FAO

Appendix 1 – Map showing properties in the SFM-WAL-FMU



Appendix 2 – Catchment summary for properties in the SFM-WAL-FMU

Property Name	Ave Rainfall (mm/annum)	Elevation (MASL)	IBRA V7 Bioregions	IBRA V7 Subregions	NRM Region	Catchment Management Body	Catchment	Sub-Catchment	Basin	Public Drinking Water	Hydrological Zone	Hydrological Zone Description	Drainage Flows (assessed by SFM)
Bramwell	882	100-120	JAF - Jarrah Forest	JAF02 - Southern Jarrah Forest	South Coast NRM Inc.	Oyster Harbour Catchment Group Inc	Oyster Harbour	Oyster Harbour_Kalgan_King	Albany Coast	No	Albany Sandplain	AS - Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels.	NA
Cheyne	717	40-80	ESP - Esperance Plains	ESP01 - Fitzgerald	South Coast NRM Inc.	South Coast NRM Inc.	Albany Eastern Hinterland	Waychincup River	Albany Coast	No	Albany Sandplain	AS - Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels.	NA
Davidson	882	120	JAF - Jarrah Forest	JAF02 - Southern Jarrah Forest	South Coast NRM Inc.	Oyster Harbour Catchment Group Inc	Oyster Harbour	Oyster Harbour_Kalgan_King	Albany Coast	No	Albany Sandplain	AS - Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels.	NA
Frawley	882	120-130	JAF - Jarrah Forest	JAF02 - Southern Jarrah Forest	South Coast NRM Inc.	Oyster Harbour Catchment Group Inc	Oyster Harbour	Oyster Harbour_Kalgan_King	Albany Coast	No	Albany Sandplain	AS - Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels.	NA
Lucknow	649	300-330	JAF - Jarrah Forest	JAF02 - Southern Jarrah Forest	South West NRM	South West Catchments Council Inc	Blackwood	Hardy Estuary_Blackwood River	Blackwood River	No	Western Darling Range	Moderately dissected lateritic plateau on granite with deeply incised valleys, includes the Darling Scarp on the western margin. Soils are formed in laterite, lateritic colluvium & weathered in-situ granite & gneiss.	NA
Maringa West	810	80-90	JAF - Jarrah Forest	JAF02 - Southern Jarrah Forest	South Coast NRM Inc.	Wilson Inlet Catchment Committee	Wilson Inlet	Wilson Inlet_Hay River	Denmark Coast	No	Albany Sandplain, Warren-Denmark	AS - Gently undulating plain dissected by a number of short rivers flowing south. Eocene marine sediments overlying Proterozoic granitic and metamorphic rocks. Soils are sandy duplex soils, often alkaline and sodic, with some sands and gravels. WD - Rises in a series of broad benches from the Southern Ocean north to the Blackwood Valley. Deeply weathered granite and gneiss overlain by Tertiary and Quaternary sediments in the south. Swampy in places.	Drains run south, connect with other drains, and down to Wilson Inlet.