



Our wood
fibre crisis:
Stopping the
Green Triangle's
forestry decline



Green Triangle
Forest Industries Hub

gtfih.com.au

Our wood fibre crisis

The Green Triangle forest and timber sector is the backbone of South Australia's regional economy, employing more than 18,000 people and injecting \$3 billion into the state economy annually.

However, it is facing one of the biggest challenges of its 145-year history; the forestry plantation estate is in decline because of perverse water policy which is over-accounting tree water use and restricting industry from replanting harvested trees.

This loss of estate will reach a staggering 30,000 hectares in 2021, stripping timber with a value of approximately \$460 million from the local economy. This once productive plantation estate is being transferred to general agriculture at a time when the nation is experiencing a critical lumber shortage for housing construction. This fibre demand has been exacerbated by recent devastating fires in South Australia, Victoria and New South Wales which has collectively led to a loss of 65,000 hectares of forest estate from the national inventory.

The gap between supply and demand continues to grow with the Green Triangle Forest Industries Hub Woodflow study (IndustryEdge, Building the Nation: Growing the Green Triangle's Contribution to Australia's Future) showing in 2021 demand for the region's resource exceeds supply by more than 600,000 m³.

Despite investor interest in plantations and growing global and domestic demand for wood products, which is anticipated to quadruple by 2050, the Green Triangle estate is shrinking at approximately 5000 hectares a year resulting in significant loss of carbon sequestration value. This is despite the region being one of the best localities in the world to produce commercial fibre, supported by a world class integrated manufacturing base.

The significant loss of plantation estate is a critical policy issue that requires urgent government resolution to protect South Australian jobs in forest, timber and construction industries.

The GTFIH in partnership with National Institute Forest Products Innovation (NIFPI) is building a comprehensive scientific evidence base to support government to deliver sustainable policy solutions to ensure the sector is no longer disproportionately impacted by water reductions. Early findings have indicated that plantation tree water use is far less than previously assumed, providing an opportunity for both primary industries and environmental gain at the 2023 Lower Limestone Coast Water Allocation Plan (LLCWAP) review.

Therefore, industry seeks government support to arrest the forest decline and stop the ongoing impacts of the LLCWAP. The sector seek an open and independent review of the existing plan in the short term, working proactively with all primary industries to deliver a future plan that can achieve our sector demands whilst protecting the finite resource.



Green Triangle Builds the Nation

The Green Triangle is Australia's premier plantation forestry and wood products region – it builds Australia delivering more wood products into domestic markets than any other region.

The region produces:



35%

of Australia's locally produced house framing and interior sawnwood



48%

of the packaging and industrial grade timber



60%

of the poles, posts, fencing and similar products, used in the agriculture, horticulture and external environments.



25%

of the nation's particleboard

This contribution to growing the nation can increase through the introduction of fair and equitable water policy, based on the most-up-to-date science, to provide confidence and security for the sector to invest.



The research – understanding plantation water use

The Forest and Timber sector is undertaking its comprehensive water research to provide government with a detailed evidence base to support the 2023 LLCWAP Plan review.

This research will support the following initiatives that will allow the sector to arrest the decline of the forestry plantation estate by:

- Introduction of a fair and equitable system Water Allocation Plan based on current science
- Introduction of a moratorium to stop the decline in estate which has reached 30,000 hectares. This is more land lost than in the 1983 Ash Wednesday bushfires. The difference then is that land could be replanted.
- Support industry to invest in new plantation.

The GTFIH has partnered with UniSA (Jeff Lawson, Stefan Peters, Pankaj Kumar, Baden Myers, Jim O’Hehir), the University of Melbourne (Richard Benyon) and Esk Mapping (Anthony Hay), to undertake comprehensive research to update and refine key assumptions in the current Water Allocation Plan whilst exploring new concepts that we know impact current water use decisions.

This research includes the key themes of:

- Investigating regional groundwater issues to assist future water management of the Lower Limestone Coast (Lawson); including
 - ▲ reviewing groundwater management boundaries
 - ▲ measuring sandstone and limestone unconfined aquifer porosity
 - ▲ groundwater recharge case studies under forestry
 - ▲ regional groundwater recharge
- Understanding if the deemed rates for plantation water use reflect reality? (Benyon)
- Examining the direct impact plantation forests on wetlands using plantation growth as an indicator (Kumar/Peters)
- Clay impedance layer mapping / modelling (Hay/Lawson)

This comprehensive work is in addition to research being undertaken by NIFPI which aims to optimise the management of plantation, water and environmental assets by filling gaps in knowledge regarding plantation water use and groundwater recharge in plantations.

Solving the challenges

2013 LLC-WAP issues	Our approach	Outcome	Future state
<p>Simplifying management zones - The 61 Management Zone boundaries are based on Hundreds instead of the hydrogeology of the region.</p>	<p>Research focused on simplifying these zones to as little as eight distinct zones that represent water resource boundaries based on hydro-geozones by undertaking stratigraphic / hydro stratigraphic investigation. This is a similar approach already adopted by the Landscape Board for other WAPs.</p>	<p>Evidence suggests that the 61 management zones could be reduced to 8 management zones based on actual hydro-geozones, simplifying water resource management, licensing and trade through use of hydro geographical boundaries, not artificial legal/ cadastre boundaries.</p>	<p>Establishment of new Management Zone system, including abandoning confusing border zone rules.</p>
<p>The LLCWAP assumes there is no groundwater recharge under mature plantations (closed canopy).</p>	<p>Data from continuous monitoring bores which show groundwater depth in or near plantations during/following significant rainfall events have been examined showing heavy rainfall events will cause significant recharge of aquifers underlying plantation. There is no 'one size fits all rule' for water recharge, it depends on depth to water table. This research will be strengthened in 2021-22 by comparisons of manual water level readings with data logger. Water levels consistently indicate that recharge estimates could be between 10 to 20% understated.</p>	<p>This proves groundwater recharge can occur under plantations; it corrects bias in the existing WAP assumptions; there is likely more groundwater resource available for industry/environmental use.</p>	<p>Department encouraged to undertake additional groundwater monitoring; up to an additional 20 data loggers to be installed. Asset cost anticipated at \$50,000 – approx. \$2500 per logger. DEW does not use the event-based logging option despite buying the technology. If telemetered this data assists in reading water levels at the correct time period, especially as readings have been reduced from quarterly to biannual due to budget restrictions.</p>
<p>The LLCWAP applies a single deemed rate plantation water use model which does not reflect individual forest licensee's actual water use. Other licensees have the flexibility to manage based on their actual use – plantation managers have tree removal as a method of controlling use.</p>	<p>A simple empirical model of plantation water use has been developed that better represents actual plantation extraction data. Research looked at 10 years of data across 22 sites.</p>	<p>This work is ongoing (due to be completed late 2021) however it has illustrated the simple empirical model provides an equitable method as already available to irrigators with water meters. It aligns with forest managers understanding of plantation growth and yield and corrects imprecise assumptions of the existing model. Ultimately there is likely to be more groundwater resource available than previously assumed.</p>	<p>Benyon equation to be accepted as deemed rate model for future WAP thereby stop the disadvantage and inequity to the forestry sector.</p>
<p>Understanding the direct impact of plantation forest on wetlands using plantation growth as an indicator – is the current 20m setback distance requirement relevant. There is no existing evidence nor literature as to whether this distance is appropriate. Furthermore, this work aimed to illustrate whether wetland type influenced the extend of tree health; ie benefits v costs from proximity to wetland.</p>	<p>Researchers developed a method to estimate tree growth parameters using broad scale remote sensor data; assumptions that trees accessing groundwater or intercepting surface water otherwise destined for a wetland will grow better than those that don't as moisture is the main limiting factor to tree growth in the region.</p>	<p>The method established can be used to compare growth parameters at different distances and across whole landscape for specific wetlands based on evidence. It replaces a single prescription basis for setbacks and buffers for better environmental and economic outcomes. This system is more complex than deemed setback as distances may vary depending on geographic conditions. Further soil and climate data will be used to strengthen this modelling</p>	<p>The department to accept the UniSA model and work with researchers on applying research to new WAP.</p>

2013 LLC-WAP issues	Our approach	Outcome	Future state
The existing LLCWAP claims all plantations with underlying water within 6m are accessing groundwater if less than 6m. This is based on groundwater modelling only and does not account for the known existence of root impeding layers.	Desktop research has shown clay layers often impede tree root growth and access to groundwater when otherwise available.	This work will address the current bias in the existing model, illustrating there is likely to be more groundwater resource than previously understood. Additional work required to strengthen the consistency of the modelling, including understanding the thickness of the clay layer by applying sap flow readers and assessing productivity data.	WAP review to consider that there is reduced water use from forestry. Benyon and Doody suggest that forest water use is from 6m and less and the current model uses 2004 depth to water. Future calculations should be based on current climate data.
Specific yield – can the estimate in the LLCWAP be improved with real data? Currently a value of 10% is uniformly assumed which can be conservative based on international literature for limestone/sandstone aquifers	Where the specific yield is higher than the assumed value of 10%, this will indicate more water is available for allocation than currently estimated by the LLCWAP. In contrast where the specific yield is lower than 10% this will indicate less water is available for allocation	Work is ongoing; UniSA and Flinders Uni undertaking investigation	Establishment of new Management Zone system, including abandoning confusing border zone rules.

NIFPI Research

2013 LLC-WAP issues	Our approach	Outcome	Future state
Optimising the management of plantation, water and environmental assets - this project is filling gaps in knowledge regarding plantation water use and groundwater recharge in plantations. These needs are being addressed by three sub-projects.	Desktop research has shown clay layers often impede tree root growth and access to groundwater when otherwise available.	This work will address the current bias in the existing model, illustrating there is likely to be more groundwater resource than previously understood. Additional work required to strengthen the consistency of the modelling, including understanding the thickness of the clay layer by applying sap flow readers and assessing productivity data.	WAP review to consider that there is reduced water use from forestry. Benyon and Doody suggest that forest water use is from 6m and less and the current model uses 2004 depth to water. Future calculations should be based on current climate data.
	Ground monitoring - Collect on-ground water use estimates. Sites were selected based on identifying high and low values of evapotranspiration (water use) using the uncalibrated remote sensing tool.	Currently 4 sites, 2 species, high/low productivity have been established and are being monitored. This data adds to previous monitoring data collected from 2004 to 2009, are being used to calibrate the remote sensing tool output to measured data.	The selection of the next round of monitoring sites has commenced. A summary of existing data has been presented which will form part of the site justification. The monitoring data has also been used to begin the process of calibrating the remote sensing tool.
	Wetland Setback– Examine wetland setbacks, their derivation, impact and improved means of managing wetlands for plantation managers. Groundwater Recharge– Improve the estimated recharge across the LLC WAP area and examine the uncertainty of the estimated recharge values.	A review of buffers including collation of requirements in Australian states and where available in published literature and the results of this have been fed back to the project partners. Consultation with plantation forest managers has developed an understanding of how wetlands are currently managed, including condition assessment and management actions which have been applied. Recharge estimation has commenced to create new modelling tools.	The wetland literature review is complete. Future work includes engagement of an ecologist to assist in the derivation of a tool for wetland management that can be applied uniformly by forest managers to determine wetlands needing management actions. Recharge estimation will more explicitly define recharge for management zones in the LLCWAP.

Ongoing Research

The forest and timber industry is committed to undertaking continued research on plantation water use in preparation for the 2023 LLCWAP review.

Research objectives include better understanding the extent of the Tertiary Confined Sand Aquifer and to investigate accessing potential volumes of water that can be sustainably harnessed and utilised for primary producer activities in the Lower Limestone Coast region.

Furthermore, work will progress on better understanding deemed rates, building a new set of data consideration through analysing specific forest estates in the current climate.

Additional sap flow readers will also be installed to improve understanding of tree water use across the broader landscape. Satellites estimate tree water use is up to 30 to 50 per cent less in some plantation estates, estimating use is as little as 1ml per hectare in some circumstances.





Environmental contribution

Carbon

Plantation forestry is one of the most efficient ways of absorbing carbon dioxide of any major land use. The Green Triangle, which is home to 334,000 hectares of plantation estate (17 per cent of the nation's total plantation estate), plays a critical role in dealing with Australia's climate agreement targets.

Due to the loss of 30,000 hectares of estate, South Australia has lost important sequestration of carbon which is estimated at 520,000 tonnes annually.

During peak growth (10-30 years) carbon sequestration is at its peak, equating to about 5.8 million tonnes in the Green Triangle annually.

Conservation Management

Green Triangle plantation growers invest more than \$400,000 annually in conservation management, enhancing and protecting remnant forest, wetlands and their important ecosystems.

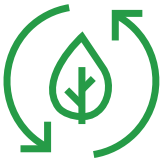
There is more than 40,000 hectares of wetland and native forest areas embedded within the plantation land estate.

A team of forestry staff are dedicated to managing and enhancing these landscapes to provide wildlife corridor links between remnant native vegetation and sanctuaries for breeding.

Ongoing work includes installation of nesting boxes and protection of remnant trees to support the endangered red tailed black cockatoo.

For example, the newly established wetlands at Castine and Phoinex plantations are now home to breeding brolga and swan.

The Green Triangle forest and timber industry is seeking a commitment from government that:



Replant.

30,000 hectares of lost plantation estate to be replanted.

This may include new State Government investment in plantation trees as land has already been lost to agriculture.



Review.

A review of the existing 2013 LLCWAP.

Greater understanding is required into whether the science underpinning the WAP is correct – the GTFIH has already proven there are flaws.

- Are the 23 assessment criteria appropriate?
- Are environmental issues, such as classifications of wetlands/ GDEs, being appropriately/fairly assessed?
- Has the existing WAP set out what it aimed to achieve?
- Environmental, social and economic outcomes?





Resolve.

A seat at the WAP decision making table.

Industry seeks the ability, alongside fellow irrigators, to have a seat at the government's decision-making table, ensuring the most up-to-date science is included in the update. The ongoing research by the GTFIH and NIFPI, which is peer reviewed, must be used in government decision making.



Resource.

A hydrogeological resource in the region.

Industry seeks the appointment of a departmental hydrogeologist based in the Lower Limestone Coast to undertake ongoing WAP reviews, acting as a trusted resource for the forest industry and key irrigators to assist with water management matters.



Recharge.

Investment in aquifer recharge solutions.

The Primary Producers Sustainable Water Group managed aquifer recharge research outcomes, 'Make Every Drop Count project', to be considered by the government for future water management investment.



Industry Collaboration

Working with our Primary Producers to harness wasted drainage water.

The GTFIH has partnered with the Limestone Coast's key irrigators, vignerons, dairy, potato growers, to form the Primary Producers Sustainable Water Group (PPSWG).

The group's mission is to be responsible stewards for the underground water resource, understanding how to collectively become improved water managers, using adaptive management principles to protect and sustain the infinite resource.

The region's high and reliable rainfall (above 600mm annually) and wide-ranging soils has earmarked the region for future agricultural growth, delivering these critical food and fibre products to growing national and global markets. Reliable long-term access is needed to groundwater to enable this growth and protect existing levels of production.

The PPSWG recognised that the region's vast drainage network, which effectively enhances the region's landscape productivity, provided a unique opportunity to increase water allocation.

Working in collaboration with the Limestone Coast Landscape Board, the group is investigating how this water, which has flows of about 110GL annually, can be harnessed for environmental and industry gain.

Through the 'Make Every Drop Count' project, a hydrogeologist will undertake a desktop feasibility study to explore and document opportunities, risks, benefits and trade-offs of establishing managed aquifer recharge schemes to achieve water quantity and water quality outcomes for consumptive (groundwater pumping and forest water use) and non-consumptive (environmental) purposes.

If proven as being a viable water resource, industry is seeking a commitment from government that a percentage of this water will be allocated to support industry growth targets and take pressure off the existing strained water management zones.

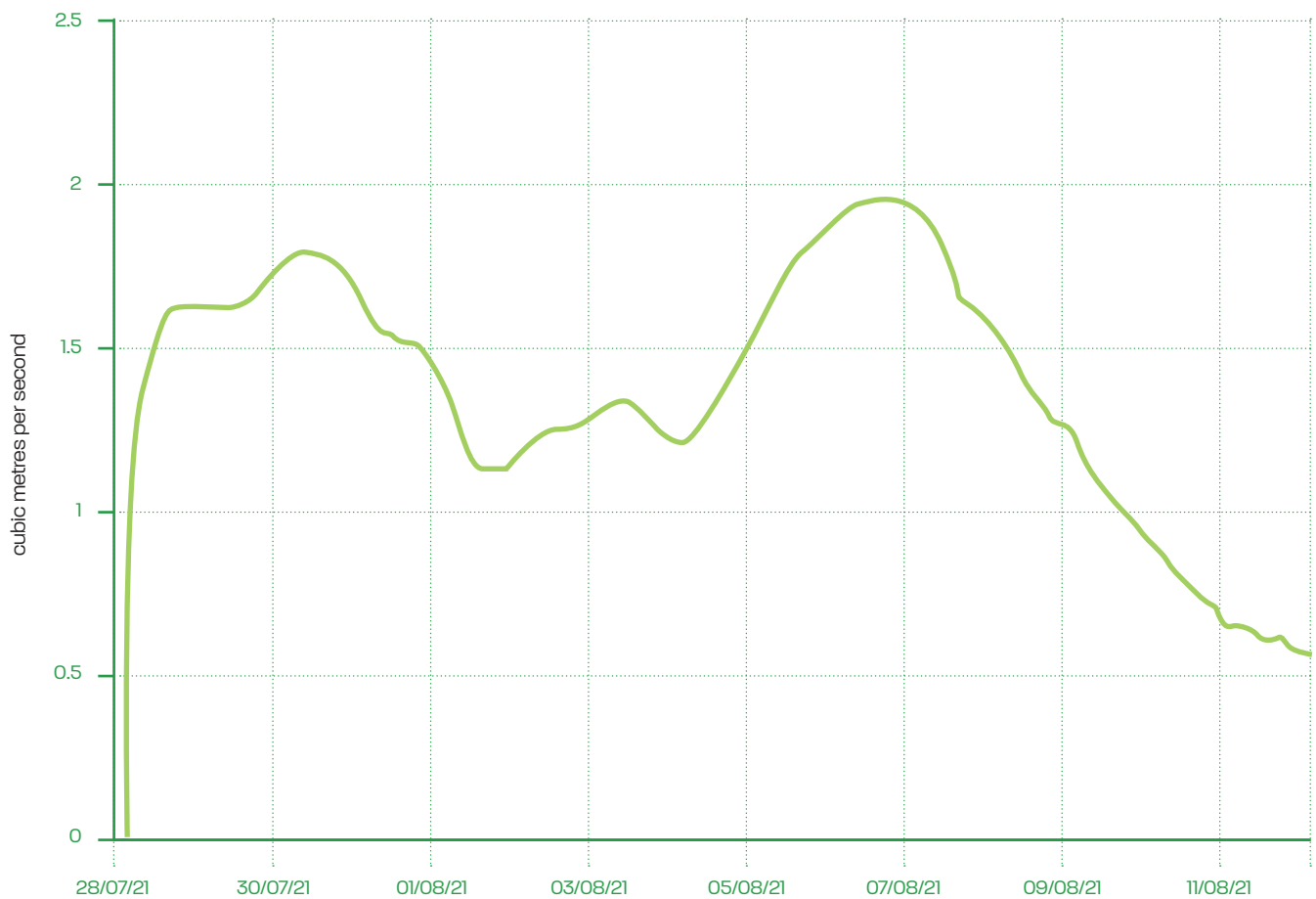
110GL of water would support:

- More than 60,000 hectares of plantation
- (50% extraction – 1.66ml/ha extraction & 0.98ml/ha interception)
- More than 78,000 hectares of vineyard (1.4 ml use per hectare)
- More than 18,000 hectares of potatoes (882,000 tonnes) (6ml per hectare)



Bakers Range North

Bakers Range South Drain



Drain data, recorded by Department of Environment loggers at Bakers Range during the peak winter rainfall showed two cubic metres of water flow per second – this equates to 7.2 million litres per hour. This is equivalent of filling almost three Olympic Swimming pools (50 metre length) per hour.

This drain covers the management zones of Coles and Short where the forest industry has disproportionately taken cuts with the inability to plant in recent years.

About us

Green Triangle Fast Facts



01

Has some of Australia's best climate, topography and accessibility for plantations and wood fibre processing.



02

Constitutes 17% of Australia's plantations, or 334,000 hectares.



03

Supplies \$3 billion in forest industry economic output.



04

Supports a workforce of more than 18,000.



05

Sees under 6% of its land used by plantations.



06

Around 5.8 million tonnes of carbon is sequestered in Green Triangle plantations annually.





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