



SUBMISSION

Response to the Draft Western Region Sustainable Water Strategy for Community Comment

June 2010



1. Executive summary

The Victorian Association of Forest Industries (VAFI) appreciates the opportunity to provide comments on the Draft Western Region Sustainable Water Strategy for Community Comment (WRSWS). In preparing this submission, we consulted widely across the forestry industry in Victoria and we worked closely with a working group of industry representatives. The working group consisted of A3P, Elders Forestry Limited, HVP Plantations, Macquarie Forestry Services, the National Association of Forest Industries and Trees Victoria.

Plantations are a minor land use in the western region (less than 8% of the total area), but the hardwood and softwood plantation estate and farm forestry operations are economically significant. Plantation forestry is a legitimate agricultural land use, which provides additional economic diversification at the regional levels as well as environmental benefits including carbon sequestration.

We believe that developing efficient and equitable policy for managing the impact of land use change on water resources in the Western Region, and all regions for that matter, is fundamentally important both for future water security and the future socio-economic contribution and sustainable growth of our industry.

Principles for efficient and equitable policy

The industry recognises that there is an existing National and Victorian framework of principles for efficient and equitable policy for land use change and interception. They are:

- Equitable treatment of all land uses;
- The impacts of interception from land use changes must be considered in conjunction with their benefits to the community;
- Management of new or additional land use change;
- Technical decisions on management should be based on evidence and sound science;
- Benefits of intervention must outweigh the costs;
- Recognition of existing rights and entitlements;
- Allow individuals to manage their own risk and exercise their choices; and
- Policy must be adaptive and flexible, supported by investment in new science and research.

These principles reflect existing Victorian Government policy positions and commitments as set out in the National Water Initiative, Action 2.20 of the Securing Our Water Future Together White Paper and the 2009 Victorian Timber Industry Strategy.

It is essential the approach under the Western Sustainable Water Strategy meet the principles set out above, as they provide a clear set of criteria for assessing approaches and considering technical and subjective elements of any approach.

Interception is not included in water accounts

Currently the water accounts and entitlement framework do not include rainfall before it becomes streamflow or groundwater and do not recognise extraction of shallow groundwater by deep rooted vegetation. As a result, accounts are incomplete and significant impacts may undermine sustainable allocation and management of water for other users, including the environment.



Policy must be inclusive of all new, significant interception activities

Historical land use has been dynamic, including clearing of native vegetation to establish agriculture and settlements. Recent, current and potential changes in land use and management, which have a potential to significantly impact on water resources include timber plantations, native revegetation, carbon and environmental plantings, perennial pasture, broadacre cropping and changes in agricultural management systems. The NWI requires parties to act to manage all significant interception activities.

It is important to be clear that replanting a crop following harvesting (including a plantation) does not constitute a change in land use.

As indicated above, Victorian Government policy positions and commitments require that any proposed water management apply to new land use change rather than existing land uses (which should be considered as the baseline) and it should apply equitably across all land uses. Such an approach supports policy to manage water rather than land use activities.

Rights for water use by land use exist

Land uses which currently intercept water have implied rights to that water use. Advice on policy development to implement Action 2.20, prepared for the Department of Primary Industries by Acil Tasman argues that interception rights exist and have been capitalised in the value of the land and retain option value, including for landowners with currently low levels of interception.

Acil Tasman contends the problem is that conflicting rights are sometimes held for the same water. Principles for efficient and equitable policy suggest that existing rights to interception be respected (and clarified) along with those of other water users.

There are number of surface and groundwater systems under stress

A number of surface water and ground water systems in the western region appear to be under stress; that is fully or allocated relative to the environmentally sustainable level of use and in some cases allocations are based on estimates which are not reliable.

We consider that addressing areas of over-allocation by reconciling allocation and actual use and developing an equitable pathway to bringing those areas back into balance should be a priority.

A targeted approach is required to managing the impact of land use and management change

There is evidence that additional stress placed on a number of groundwater systems by land use change through direct extraction and interception of recharge. In addition, there appears to be a cumulative and localised impact from land use change on surface water in a small number of localities.

However, the impacts are not uniform and highly dependent on the mix of land uses, geographic and management factors. Notable impacts are limited.

We consider there is also no case for a statewide or regionwide regulatory framework. However, there may be a case for a targeted policy response in problem areas, within a consistent statewide approach.



Forestry water use must be kept in perspective

Despite, forestry receiving the most focus in research and policy discussions, it is only part of the picture of land use change and management impact on water resources.

Currently, there are 68,000 hectares of softwood and 130,000 hectares of hardwood plantations in the western region. Despite, the increase in Blue Gum plantations in the last 20 years, plantations remain a minor land use and the predictions of future plantation expansion have been largely overestimated. Plantation establishment across Victoria last year was only 3,000 hectares. Future growth is likely to be small.

Likewise, predictions of increases in plantings for carbon sequestration and bioenergy need to be tempered given the policy and market uncertainty, which is likely to inhibit incentives in the medium term.

Moving from annual pasture to timber plantations does represent a shift in average interceptions on a per hectare basis; one study estimates it be about 90mm for a 700mm rainfall area. Studies have found that perennial pasture, such as lucerne, can increase interceptions relative to crops by 75mm for a 600mm rainfall zone and 250mm for an 800mm rainfall zone. Given that, the area of perennial pasture increased by about 330,000 hectares between 1990 and 2001 and the area of Blue Gum plantations increased by less than 70,000 hectares over the same period, the impact of perennial pastures (and other land use changes) would appear to warrant a higher level of investigation.

Significance must be measured in terms of scale as well as intensity

As discussed above, it is important to distinguish the scale of impact from intensity. As the Acil Tasman report states, “the cumulative scale of trends into higher yielding and more drought resistant pasture and crop species from alternative crop and pasture management systems could exceed those of forestry in many areas.”

We consider the unit of measurement, the threshold and the test for significance require further consideration.

Flexibility and timing are important factors

It should be noted that the impact of land use and management change, including plantations on water resources is complex and requires an understanding of the intensity as well as scale of the impact, timing, site factors and management regime. These factors are not well reflected in the modelling to date.

Clarifying rights requires careful consideration because interceptions by vegetation cannot be flexibly, economically and rapidly regulated to protect other rights.

The baseline must not be retrospective

The plantation timber industry is adamant that there is no basis to penalise existing plantations with the application of new water policy. The reasons are:

- Re-investment decisions, including expected recurrent costs and returns, in existing plantations were made at the time the plantation land was secured.



- Existing plantations contribute to processing industries, many of which have long-term agreements for wood supply based on existing plantation resources.
- Plantations contribute a wide range of environmental outcomes not provided by agricultural land-use.
- Consistent with NWI and Action 2.20.

We consider that, given the complexities involved in fully developing the policy for managing the impact of land use change on water resources, setting a baseline date that allows more time to resolve key methodological issues would be beneficial.

In particular, a step-wise policy approach, with options available may be appropriate. For example, clarification of rights, addressing situations of overallocation and developing regionally-appropriate policy measures to manage land use change in identified 'stressed' catchments may be a logical pathway.

Benefits of land use change to the community must be considered

Land use change can provide socio-economic and environmental benefits to the community, including carbon sequestration, biodiversity conservation and salinity mitigation. In this context and in the sense of deriving greater value from a scarce resource, some land use changes that increase interceptions will be desirable and sound policy will not be just about limiting interceptions.”¹

There are key areas of uncertainty

Our current understanding of the impacts of land use change is minimal at best. Empirical research has been largely focused on the impact of plantations in a small number of (generally highly stressed) localities. However, there is need for a better understanding of all water users outside the water entitlement framework is required to ensure all water users are treated equitably and the resource is sustainability managed. There are also limitations to the modelling in terms of assessing the actual impact of land use change, given management scenarios and for groundwater.

We believe, there is strong cause for proceeding with caution and managing the impact of high costs associated with policy interventions. The risks associated with intervention can be managed through targeting intervention at the source of the problem.

An efficient and equitable approach in Victoria will be consistent with South Australia

The WRSWS summarises a number of approaches and also suggests Victorian policy should be complimentary with that in South Australia. The forestry industry in South Australia has been extremely concerned with these proposals due to their retrospectivity, lack of consideration of positive environmental benefits, use of assumptions and methodologies which do not reflect the level of uncertainty in the data on which they are based or allow for an appeal mechanism, the lack of appropriate consideration of significance, discrimination against plantations relative to other land uses and the lack of equity. South Australian policy is not considered compliant with the NWI. The WRSWS also overstates the progress made in South Australia.

We consider that an efficient and equitable policy framework would be complimentary with that developed in South Australia; it does not have to be the same or similar.

¹ Ibid., p. xiv



Potential policy and management approaches

The WRSWS argues that doing nothing is not an option. In a number of specific cases, there does appear to be sufficient information about the impact of land use change to develop a management approach. However, any policy and management approach must be developed through a careful and rigorous process to achieve an efficient and equitable outcome.

The WRSWS presents eight management options. We believe these are policy options that would be considered at the regional level, following the development of a statewide approach to clarifying rights and addressing areas of overallocation. We believe that different approaches may be appropriate for different regions and that tools may be used in combination.

At this stage, we do not believe that collaborative approaches or an environmental significance overlay are viable options.

Recording of significant land use changes and water may support better knowledge on which to base policy options, however it would not limit water use.

Zoning and declaration of special areas under the CaLP Act

Any planning approach must recognise plantations as an as-of-right crop and treat plantations equitably with other land uses. That means, any planning trigger must apply to other land uses and management. It should be transparent and consistent.

Zoning and declaring special areas under the Catchment and Land Protection Act may provide a targeted response. However, it is fundamentally important that these options not be a bandaid solution to responding to historical overallocation or long term changes in the water availability.

These options manage the activity rather than the water, limiting the ability of individuals to manage their own risk and exercise their choices. They also raise a number of questions:

- How would water stressed areas be defined?
- What weight will be provided to land use intensity as opposed to scale?
- What transaction costs might be imposed on landowners?
- How would wider environmental benefits such as carbon sequestration and biodiversity be considered?
- What assumptions and methodologies would be adopted?
- Will offsets be allowed?
- Would there be scope for an appeal mechanism based on:
 - Independent evidence on the likely impact on water yield?
 - The net benefits provided by the land use activity?

The latter option also requires consideration about the impact of the Land and Biodiversity White Paper on institutional arrangements for natural resource management. It would be essential that conditions apply to land use and land management change rather than retrospectively applying conditions to existing use.

We are concerned that without offsets and flexibility mechanisms, these approaches could simply regulate to prevent land use change or allow many small water users at the expense of large water users rather than allow water to flow to higher value uses. This could be a poor policy outcome.

We are cautious about the applicability of these approaches.



Integrating interception into water resource management

Integrating interception in water resource management would be a policy to manage the water rather than the activity and therefore a more direct approach. It may also facilitate water use according to the highest value rather than first movers or many small interceptors at the expense of more intense ones.

This approach also offers a potential set of tools, which could be applied as 'building blocks', depending on the need to act.

Again, this approach must not discriminate between land uses. There should be full consultation on what land uses are included in the accounting but it must be sufficient to pick up intensive and cumulative impact of large scale changes.

Accounting for water use could provide a first step measure that may be applied in combination with others, where appropriate or as a system of monitoring in areas that are not currently stressed.

We are broadly supportive of a registration system that would record and track ALL land uses over time and allow interception to be incorporated into water accounting. It could also be relatively cost efficient and transparent.

We believe that a registry could be one mechanism for clarifying existing rights to interception. It could also provide a basis for an entitlement system in the future, which would support the flow of water to its highest value use.

Voluntary registration could be a step towards mandatory registration, however, if licensing or entitlements were considered likely, registration would need to become mandatory.

However, there are number of considerations:

- Would a baseline apply for future progressions to water entitlements or licensing to protect existing land uses?
- How would all significant land uses be captured (includes revegetation, perennial pasture, plantations)?
- What assumptions and methodologies would apply?

The WRSWS proposes a cap on interceptions could be introduced and it could be coupled with a mechanism to declare 'areas of intensive management'. Licensing could create trading options by establishing a formal water entitlement.

We believe that there are opportunities for interception policy to transition to licensing.

However, as the Draft Western Region Sustainable Water Strategy for Community Comment articulates, "the framework must be based on sound and defensible estimates of water use."² At the moment, our understanding of the impact of land use change on water resources remains limited – particularly for land uses other than plantations and for groundwater.

We also believe the following issues require serious consideration:

² State of Victoria (2010) Draft Western Region Sustainable Water Strategy for Community Comment, Victorian Government Department of Sustainability and Environment, <http://www.ourwater.vic.gov.au/programs/sws/western/copy-of-draft-strategy>, p. 164



- In the western region, how much water could be included in an interception cap, above the water currently intercepted by existing land uses?
- Given that land uses such as plantations are highly inflexible, what would be the nature and reliability of an interception entitlement?
- What would be the technical basis underpinning an entitlement system and how would improvements in knowledge be treated?
- How tradeable would entitlements be given that there is limited trading in extractive entitlements in the western region and depending on the existing entitlements and the cap, the number of sellers could be small and the physical constraints significant?
- What conditions would apply to trade?
- How could such markets link to or undermine other markets, such as carbon markets?

Conclusions

We consider that the range of options presented in the WRSWS offer pathways forward for the Victorian Government to work with all stakeholders to deliver a policy that is targeted, equitable, minimises the regulatory burden and maximises the value of water use to the community.

On balance, the options presented under the water resource management framework provide a more efficient and equitable approach. This framework also lends itself to a progression over time, which will benefit from improved monitoring, knowledge, technology and development of water trading in the western region.

We consider that a multi-layered approach is necessary so that there is a statewide policy approach but measures are regionally-appropriate and targeted.

The complete development of a policy will require significant further work and we as an industry are committed to working with the Victorian Government in this process.

We consider that the principles for efficient and equitable policy, which reflect Victorian Government commitments, provide a clear set of criteria against which to further develop policy to address the impact of land use change on water resources.

In addition, we consider that there is significant technical work required to underpin the development of this policy, including:

- Assessment of the impacts of land use and management change on system hydrology for a broader range of land uses;
- Assessment of actual impacts of land use change and management through empirical research and examination of the impact of management and site factors;
- Improved hydrologic mapping of groundwater resources; and
- Improved modelling of groundwater use by deep-rooted vegetation.



2. Questions for comment

Chapter 6 of the WRSWS poses four questions comment. We have addressed them directly below. However, they should be considered in conjunction with the full content of this submission.

1. Which of the options discussed above do you think could be used to manage the impacts of water interception and protect existing water users and the environment?

In general, the options which integrate interception into water resource management will provide the efficient, adaptive and flexible policy measure. The package of tools available would allow improved information and monitoring as part of the water accounts. The water management framework also provides options to better control water use in stressed systems by potentially creating value for water to flow to its highest value use.

See section 10 for an assessment of the policy options presented in the WRSWS.

However, we believe that a stepwise approach should be undertaken and the remains substantial amount of work to consider the practical challenges, benefits, risks and implications of this set of options. See section for a discussion the policy considerations.

Any policy approach should be developed consistent with policy principles for efficient and equitable policy, which reflect Victorian Government policy positions and commitments. See section 6 and Appendix 1 for a discussion of the policy principles.

We believe it is important for the Victorian Government to work with all stakeholders during this process.

2. Do you think the Government should have the power to target areas that are under water stress from land use change?

There are only a small number of localities where land use and management change appears to be significantly contributing to water stress. We believe that although, interception should be better accounted for, it is only these areas that should be targeted by direct policy measures which provide landowners with the tools to manage the opportunity cost of future changes in land use. See section 8 for a further discussion of these issues.

There must be a science-based, transparent and predictable process for identifying these areas.

3. How do you think we should decide when water use by land use changes is significant enough to take action?

All land uses should be treated equitably and thus included with the management focus to be on water use, rather than the activity.

We believe that a set of criteria should be developed to assist in identifying significant water use by land use and land management changes. The criteria should capture the intensity, timing and cumulative scale of land use and land management impacts.



See section 8 for a discussion of policy considerations, including equitable treatment of all land uses and significance.

4. Do you think existing land uses should be managed or controlled if they are contributing to unsustainable water use in a sub-catchment or aquifer? If so, what would be an appropriate way of managing their impacts on water resources?

The NWI requires new land use changes to be managed or controlled. Victorian Government policy also states that this policy will not be directed to existing land uses.

As such the baseline for management must not retrospective and the existing rights to interception should be recognised. It is important to be clear that replanting a crop following harvesting (including a plantation) does not constitute a change in land use.

However, we recognise that there is dilemma in the need to bring overallocated or stressed systems back into balance.

It is important to separate the impact of land use change from issues of allocative stress and reduced rainfall. Addressing land use change should not be a proxy means for bringing systems back into balance but rather the rights of all water users, including interceptors should be recognised and measures developed to address overallocation. We believe there may be opportunities for equitable ways forward such as for the Victorian Government to purchase entitlements or rights back from water users.

See section 8 for a discussion of these issues.



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4. Introduction

The Victorian Association of Forest Industries (VAFI) appreciates the opportunity to provide comments on the Draft Western Region Sustainable Water Strategy for Community Comment.

The VAFI is the peak forestry industry body in Victoria. It was established in 1945 and represents its members' interests to governments, communities and markets. Our members include forest growers, processors and associated bodies.

In preparing this submission, we consulted widely across the forestry industry in Victoria and we worked closely with a working group of industry representatives. The working group included A3P, Elders Forestry Limited, HVP Plantations, Macquarie Forestry Services, the National Association of Forest Industries and Trees Victoria.

The forestry industry is a significant contributor to the Victorian and the western region economies.

The industry is an important source of rural and regional jobs, directly supporting approximately 25,500 people.³ Using commonly accepted practice, it is estimated that Victorian timber industry indirectly employs around 32,000 people.⁴

The industry supports an important manufacturing sector and makes a significant socio-economic contribution in regional Victoria. Victorian sourced timber generated approximately \$3 billion in economic value in 2007-08 and much more in flow on economic activity. Victoria's sales and services income from wood and paper product manufacturing industry is \$6.5 billion.⁵

The western region includes areas of the Green Triangle and is a nationally significant and highly productive plantation growing area. There are 68,000 hectares of softwood plantations, many of which were established before 1990. Many are into a second rotation. The area of hardwood plantations has increased significantly since 1990; from almost no hardwood plantations to over 130,000 hectares.

Plantations are a minor land use in the western region (less than 8% of the total area), but the hardwood and softwood plantation estate and farm forestry operations are economically significant. The industry is a significant employer and contributor to the regional economy. The state government in its regional and transport strategies has recognised and supported the development of plantations in the region.⁶ From 2010, a large proportion of hardwood plantations in the Green Triangle are of harvestable age, which will facilitate an increase in downstream employment.

Plantation forestry is a legitimate agricultural land use, which provides additional economic diversification at the regional levels as well as environmental benefits including carbon

³ State of Victoria (2009) 2009 Victoria's Timber Industry Strategy, Department of Primary Industries, December, <http://new.dpi.vic.gov.au/forestry/timber-industry-strategy/timber-industry-strategy-main>, p. 10

⁴ ForestWorks (2006) *Forest and Wood Products Industry Workforce and Industry Data Collection Survey Report 2006*, National Skills Company for the Forestry and Forest Products, Furnishing and Pulp & Paper Industries Ltd and Forest and Wood Products Australia, Melbourne

⁵ ABARE (2008) *Australian Forest and Wood Product Statistics*, March and June quarters 2008, Canberra

⁶ See

<http://www.transport.vic.gov.au/web23/Home.nsf/AllDocs/8CFE4E475818612ECA257625001A3DFE?OpenDocument> and <http://www.rdv.vic.gov.au/home>



sequestration. It is the only broadacre agricultural land use to operate to a mandatory code of practice.

The regional Sustainable Water Strategies are the cornerstone for developing regionally appropriate management frameworks for water demand and supply.

We believe that developing efficient and equitable policy for managing the impact of land use change on water resources in the Western Region, and all regions for that matter, is fundamentally important both for future water security and the future socio-economic contribution and sustainable growth of our industry.

5. Draft Western Region Sustainable Water Strategy

The Draft Western Region Sustainable Water Strategy for Community Comment (WRSWS) describes the water resources in the western region and in particular, the reduced water availability over the past 13 years due to drought and then discusses the implications of climate change scenarios and a continuation of reduced rainfall. It contends that climate change and climate variability will heavily affect water resources and land management in the future. There also appears to be a number of surface water and ground water sub-catchments which are under stress from the level of extraction and interception. The role of reduced rainfall appears to be a significant factor.

Chapter 6 of the WRSWS discusses concerns and the available information on the impact of land use and land management change on the region's water resources. It includes a large focus on plantation forestry as a major interceptor. The WRSWS presents a range of policy options and poses questions about appropriate action.

This submission will address the discussion, options and questions in chapter 6 and discusses pathways forward for addressing interception that in the context of principles for efficient and equitable policy, reflect existing Victorian Government policy positions and commitments.

6. Principles for efficient & equitable policy

The industry recognises that there is an existing National and Victorian framework of principles for efficient and equitable policy for land use change and interception.

Overarching National and Victorian water and timber industry policies provide a framework for addressing land use change and interception and principles for specific policy initiatives. We consider the following National and Victorian agreements, strategies and policy documents to be directional in addressing land use change and interception at the regional or state level in Victoria:

- The National Water Initiative (NWI)– sections 55-57 & provisions relating to assignment of risk
- Victorian Securing Our Water Future Together White Paper 2004 – Action 2.20
- The Victoria's 2009 Timber Industry Strategy (TIS) - Actions 5.1 and 4.1
- Murray-Darling Basin Authority's Water Plan – under development

A discussion of these agreements, strategies and policy documents is set out in Appendix 1.

Based on the consideration of policy principles in each of the agreements, strategies and policy documents in Appendix 1, we believe that the set of policy principles below provide a clear set of criteria for assessing management options for the treatment of land use change in the WRSWS.



Table 1. Principles for efficient and equitable policy on land use change and water

Principle	Links	Victorian Government commitments
Equitable treatment of all land uses	<p>Consideration of all land uses with a significant or potentially significant impact on water resources</p> <p>Equality in coverage of land uses, measurement of significance and management approach</p> <p>WR SWS Guiding Principles (Shared benefit and shared responsibility, socially responsible decision making)</p> <p>Acil Tasman</p> <p>DPI – Victorian Government</p>	<p>NWI</p> <p>Action 2.20</p> <p>TIS 5.1</p>
The impacts of interception from land use changes must be considered in conjunction with their benefits to the community	<p>Impacts on water yield should be considered in conjunction with other impacts including socio-economic impacts, salinity, carbon and other environmental impacts.</p> <p>WR SWS Guiding Principles (shared benefit and shared responsibility; maximising environmental outcomes, maximising efficiency and seeking multiple benefits)</p> <p>Acil Tasman and DPI – Victorian Government: Where action is appropriate, a response should be flexible, adaptable and tailored to local circumstance, within a consistent statewide approach that ensures comparable responses to like circumstances.</p>	<p>NWI</p> <p>Action 2.20</p> <p>TIS 5.1</p>
Management of new or additional land use change		<p>NWI</p> <p>Action 2.20</p>
Technical decisions on management should be based on evidence and sound science	<p>DPI – Victorian Government (science on the causes of interception and impacts of intervention)</p>	<p>NWI</p> <p>Action 2.20</p> <p>TIS 5.1</p>
Benefits of intervention must outweigh the costs	<p>WR SWS (being prepared without acting prematurely)</p> <p>Acil Tasman (manage risks of damage by targeting causes rather than symptoms)</p> <p>DPI – Victorian Government (and avoid sudden, material change to asset values)</p>	<p>TIS 5.1</p>
Recognition of existing rights and entitlements	<p>WR SWS (recognition of existing rights and entitlements)</p> <p>WR SWS Legally secure but varying reliability, assignment of risk & third party impacts will be defined and reduced or compensated. Also links to socially responsible decision making and maximising environmental outcomes.</p> <p>Acil Tasman – rights should be assessment in terms of option value rather than current use (including rights not yet exercised)</p>	<p>Victorian Water White Paper</p>
Allow individuals to manage their own risk and exercise their choices	<p>WR SWS (maximising efficiency)</p> <p>Acil Tasman</p> <p>DPI – Victorian Government</p>	
Policy must be adaptive and	<p>WR SWS (Links to managing the impacts of</p>	

Principle	Links	Victorian Government commitments
flexible, supported by investment in new science and research	climate change and climate variability) Acil Tasman DPI – Victorian Government	

It is worth noting that the NWI, Action 2.20 and the Government’s TIS collectively describe commitments by the Victorian Government. We have also included the Guiding Principles in the Draft WR SWS and where applicable, we have noted the principles articulated in the Acil Tasman report.

We believe it is essential the approach under the Western SWS meet the principles set out above, as they provide a clear set of criteria for assessing approaches and considering technical and subjective elements of any approach. This will ensure any approach is consistent with Victoria’s policy commitments and with national (and interstate) policies and provide a basis for a rigorous, transparent, efficient and equitable approach.

Plantation industry policy principles

As a responsible land user, the plantation industry recognises it has a role to play in national and state water management. Consequently, the ‘Australian Plantation Industry National Water Policy’⁷ was developed to better inform policy makers and regional water planners on what the industry considered to be sound public policy principles for the treatment of plantations.

The industry policy advocates that:

1. Plantation forestry is a dry-land (non-irrigated) agricultural land use and any policy contemplated in relation to interception of water by plantations should be considered only as part of a full debate on water interception by all dry-land agricultural land uses;
2. All policy on water interception must be underpinned by sound, repeatable and reliable science;
3. All policy on water interception should take into account issues of water quality as well as water quantity;
4. Clauses 55-57 of the National Water Initiative should only be implemented as written, that is, constrained to consideration of land use change (for example new plantations) not existing land uses;
5. If land use change to plantation forestry is included in a water entitlement system, there must be appropriate allowance for the differences between extractive water use and natural interception of water by plants.

In particular, the Policy sets out principles for dealing with interception in regional water plans, including:

- The significance of increase water interception associated with land use change must be assessed based on scientific evidence and supported by socio-economic analysis; a community consultation process alone is not adequate.
- Identification of significant interception resulting from land use change should include all forms of change in land use and land management practices which may result in increased or decreased interception of surface and or ground water.

⁷ A3P, Australian Forest Growers, National Association of Forest Industries and Timber Communities Australia (2007) Australian Plantation Industry – National Water Policy, July, <http://www.a3p.asn.au/admin/assets/pdf/Key%20Issues%20-%20Sustainability/Water%20&%20Plantations%20-%20National%20Water%20Policy.pdf>



- All forms of land use and/or land management practices within a water plan region should be quantified as accurately as possible.
- The estimation process must deal with scale and cumulative impacts as well as intensity, position in the landscape and timing impacts.
- The threshold size of the interception to be used as the basis for defining the significance of a water interception activity should be determined having regard to regional circumstances and impacts on regional NRM outcomes.
- The efficiency of the use of intercepted water to provide benefits through plantation management should be understood and compared with the efficiency, benefits and costs of other uses (i.e. assessed in terms of the opportunity cost and value).

We remain committed to the principles articulated in this position and we believe they are both constructive in addressing land use change and water resources management and consistent with the principles articulated in National and Victorian policy commitments.

We have been informed the WRSWS will, to some degree, set a precedent in the interpretation and implementation of sustainable land use and water policy principles and plans in Victoria, and potentially elsewhere. It is important that the development of the Western Region SWS build on these high level principles and, where appropriate, improve on them in relation to such issues as interception and the equitable treatment of regional land uses.

7. Land use change and its impact on water resources in the Western Region

The western region of Victoria is an important contributor to state and national agricultural and forestry production. Continuing land use and socio-economic change has occurred across the Green Triangle (including part of the western region and part of South Australia) and Central Victoria over the past several decades.

Land use changes between 1991 and 2006 in the Green Triangle region, covering part of the western region as well as part of South Australia included expansion of plantation forestry, increase in rural residential properties, increase in cropping, decrease in wool production in some areas, increase in prime lamb production, and a range of changes to the dairy industry.⁸ Overall, bluegum plantation, beef cattle, dairying, viticulture and cropping all increased in area – with cropping having the largest increase – while the total area for sheep and lambs decreased.

7.1 Land use change can potentially have an impact on water resources

Currently the water accounts and entitlement framework do not include rainfall before it becomes streamflow or groundwater and do not recognise extraction of shallow groundwater by deep rooted vegetation.

All users of water can have an impact if they are not considered within the total water budget or lifecycle. Understanding the impacts of these changes and the level of risk is essential. It is necessary to determine, create and implement mitigation and measures to reduce the adverse impacts activities pose on water resource security.

⁸ Schirmer, J., Williams, K., and Dunn, C. (2008) Preliminary summary of findings of the Land Use Change project, Report prepared for the socio-economic impacts of land use change in the Green Triangle and Central Victoria project, http://www.landusechange.net.au/downloads/Land-use-change_summaryreport.pdf



Changes in land use and land management (land use change) are ongoing and have a potentially significant impact on water resources through altered interception of rainfall and use of groundwater.

We acknowledge all land use and management changes can have both positive and negative impacts on the availability of water resources to the environment, water users, and for future use. These water resources are an extremely important but finite resource that needs to be monitored and managed. The sustainability of the resource is essential to ensure that the environment, current and future users have access to reliable water at the quality and quantity to enable environmental and productive systems to survive and prosper.

A number of research and modelling projects have explored the impact of land use change on water resources, including for the Western Region of Victoria. The results provide some indication of the level of impact. The impact of plantations has been studied most extensively. However, the understanding of the impact of many land use and land management changes is limited and there remains a high degree of uncertainty about the actual interception over time and in all but a few 'hot spot' areas.

Much of the policy discussion about land use change and interception has focused on forestry, resulting in a polarised debate. Some forestry expansions do pose a challenge for water resource management, but they are one form of interception and part of the total interception picture. Indeed, other land use and land management changes may be exerting more pressure on water resources due to their scale and cumulative impact.

It is important to broadly look outside the current entitlement framework to identify, qualify and quantify the potential consequences. The WRSWS has made a sizeable and intrepid attempt to identify current key land use change activities. When considering these activities, the intended timeline of a 50 year outlook needs to be remembered. A 50 year strategy requires a holistic, panoramic and adaptive view of the potential water use change activities. This will ensure a robust and all encompassing strategy provides security for all users.

7.2 Timber plantations

There are approximately 198,000 hectares of timber plantations in south west Victoria. While the area of softwood plantations has remained relatively stable (currently approximately 68,000 hectares), the area of hardwood plantations has increased significantly over the last 10-15 years from a very low base to approximately 130,000 hectares.

Despite this growth, the plantation industry covers a relatively small percentage (*Table 2*) of the productive land of the Western Region. On average the cover of plantations is 6 -8% of the productive land area.⁹ The expansion of the plantation industry over the last 10 years has been dwarfed by the land use change expansion of dairy, cropping and perennial pastures.

Table 2. Plantation cover in the western region, by local government area, 2009¹⁰

LGA	Area (ha)	Softwood plantation	Hardwood plantation	Plantation Total	% of Total area
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⁹ Sinclair Knight Merz (2008) Water and Land Use Change Study: Changes in Hydrology and Flow Stress with land use change in South-West Victoria, Final Technical Report

¹⁰ Green Triangle Regional Plantation Committee (Source: SERIC)



Ararat	420,831	-	3,108	3,108	0.7
Glenelg	621,497	58,699	55,341	114,040	18
Moyn	548,037	240	17,846	18,086	3
Southern Grampians	665,193	928	32,613	33,542	5
West Wimmera	910,359	8,386	21,196	29,582	3
	3165917	68253	130104	198358	6.3

Farm forestry has also progressively increased, primarily in lower rainfall areas and providing a range of environmental as well as economic benefits to farm operations. However, farm forestry projects are much smaller in scale and more dispersed across the landscape than larger scale plantation projects.

Plantation water use

Plantation forestry in higher rainfall zones (i.e. >700 mm per annum) is one of the more intensive water uses when measured on a per hectare basis. Trees have the ability to intercept rainfall before it runs off into streams or ground water, they can also extract shallow ground water through their roots. This pattern of interception was more widespread across the landscape before native vegetation was cleared by the early settlers.

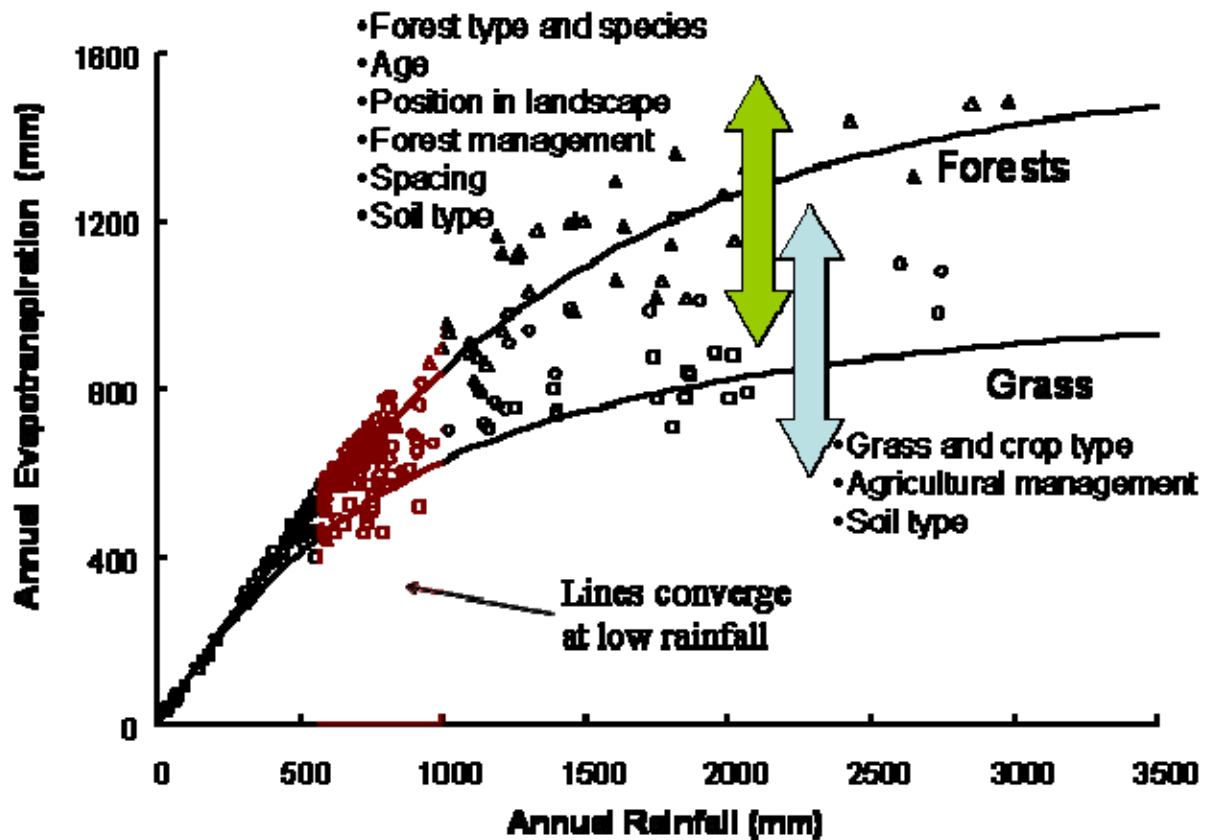
Rainfall interception

Research and modelling indicates that apart from during the fallow period and in their early life, trees intercept substantially more rainfall than pasture. Estimates vary depending on location in landscape, rainfall and other factors but according to one study, “on average, streamflow or recharge from Blue Gum plantations is about one-third of that occurring from pasture.”¹¹ However, this effect is not universal and depends on the relationship between rainfall and evaporation as shown below.

¹¹ Benyon, R., Doody, T., Theiveyanathan, S. And Koul, V. (2008) Plantation Forest Water Use in South-west Victoria, Technical Report No. 164, Report prepared for Glenelg Hopkins Catchment Management Authority and Forest and Wood Products Australia, November, [http://www.fwpa.com.au/Resources/RD/Reports/PNC064-0607 Plantation Water Use Research Report.pdf?c=1&pn=PNC064-0607](http://www.fwpa.com.au/Resources/RD/Reports/PNC064-0607%20Plantation%20Water%20Use%20Research%20Report.pdf?c=1&pn=PNC064-0607)



Figure 1: Zhang curves showing the relationship between rainfall and evapo-transpiration for forested and grassy catchments shown in Benyon et. al. (2007)¹² and replotted by Polglase



As the WRSWS notes, plantation water use varies significantly across the rotation and cannot easily be altered once the plantation is established, although water use will vary with climatic conditions. It is also likely to vary significantly across the region, given the variation in rainfall and geography. Where plantations are situated in areas where the rainfall is less than 700mm/yr, their impact is not dissimilar to other types of vegetation.

Location and site factors and management practices can impact on the amount of water use as well as productivity. Research by the CSIRO explored factors that affect plantation water use in a rainfall zone of 700 mm/yr and where the baseline for water use is 610 mm/yr, compared with grassland water use of 520 mm/yr. The research found that while the average difference in water use between the plantation and grassland was 90 mm/yr, factors such as soil depth, rainfall season, slope aspect, soil nutrient status, rotation, spacing, thinning, forest health and landscape position could have a significant impact on the level of water use.¹³ For instance, preliminary indications are that thinning could reduce water use by approximately 40 mm/yr. The results however, are indicative and suggest that more research is required to better refine estimates the magnitude of impact.

Use of groundwater

¹² Benyon, R., England, J., Eastham, J., Polglase, P. and White, D. (2007) Tree Water Use in Forestry compared to other dry-land agricultural crops in the Victorian context, Ensis Technical Report No. 159

¹³ Ibid.



Where there is shallow groundwater (less than 6 metres) and where soil depth allows deep root penetration, trees can continue to draw water in dry periods, creating years where run off is fully utilised and water is drawn from the groundwater so that there is a negative net contribution to water resources.

“Blue Gums can extract up to 6.7ML per hectare each year when in contact with shallow groundwater.”¹⁴

In some areas, clearing of native vegetation has increased groundwater recharge and mobilised salts stored at depth. In some cases, replanting trees can have beneficial effects by lowering water tables and reversing the salinity trend. However, in groundwater systems where salinity is not an issue and there are consumptive pressures on the resource, direct access by vegetation can reduce the quantity of water available for other uses, including the environment.

The impacts of plantations on water availability at the catchment level are small, however, there can be impacts on water availability at the local and sub-catchment scale.

7.3 Carbon and environmental plantings

There exist a number of forestry carbon offset projects, which are accredited through Greenhouse Friendly and other voluntary market instruments. However, the current uncertainty created by the postponement of the Carbon Pollution Reduction Scheme (CPRS) and debates as to whether afforestation and reforestation projects will be included within the National Carbon Offset Standard, has introduced uncertainty to the market for carbon offset plantings.

Government and market drivers will also play a key role in establishing demand for carbon planting projects and in their characteristics. Under the current framework, growth in carbon plantings is unlikely to accelerate greatly. However, it is likely that in the medium term the regulatory structure will develop such that there is a market to support growth in carbon planting.

A direct comparison between commercial or voluntary carbon plantings and commercial plantation forestry for forest products is not possible because although they share similarities, there are also distinct differences between them. First carbon plantings can be dispersed across the landscape, since they do not need to be within proximity to processing and transport infrastructure¹⁵. Second, under current arrangements trees are unlikely to be harvested and the management regime will differ – leading to a varied impact on water resources over time. Third, experience to date has shown that carbon plantings have occurred mostly in the <700mm rainfall zone where the impact of land use change on rainfall interception is arguably reduced. Fourth carbon plantings can be undertaken in a variety of configurations from block plantings to agri-forestry plantings integrated within agricultural enterprises.

As with plantations and other forms of environmental revegetation, carbon plantings can provide multiple environmental benefits in addition to carbon sequestration.

¹⁴ State of Victoria (2010) op. cit., p. 150

¹⁵ Polglase, P. and Benyon, R. (2009) The impacts of plantations and native forests on water security: Review and scientific assessment of regional issues and research needs, Report prepared for Forest & Wood Products Australia, <http://www.fwpa.com.au/Resources/RD/Reports/PRC071-0708%20Plantations%20Research%20Report.pdf?c=4&pn=PRC071-0708>, p. 51



Importantly, these projects are often also covered by legal contracts or agreements requiring them to be maintained over the long term (generally for 100 years).

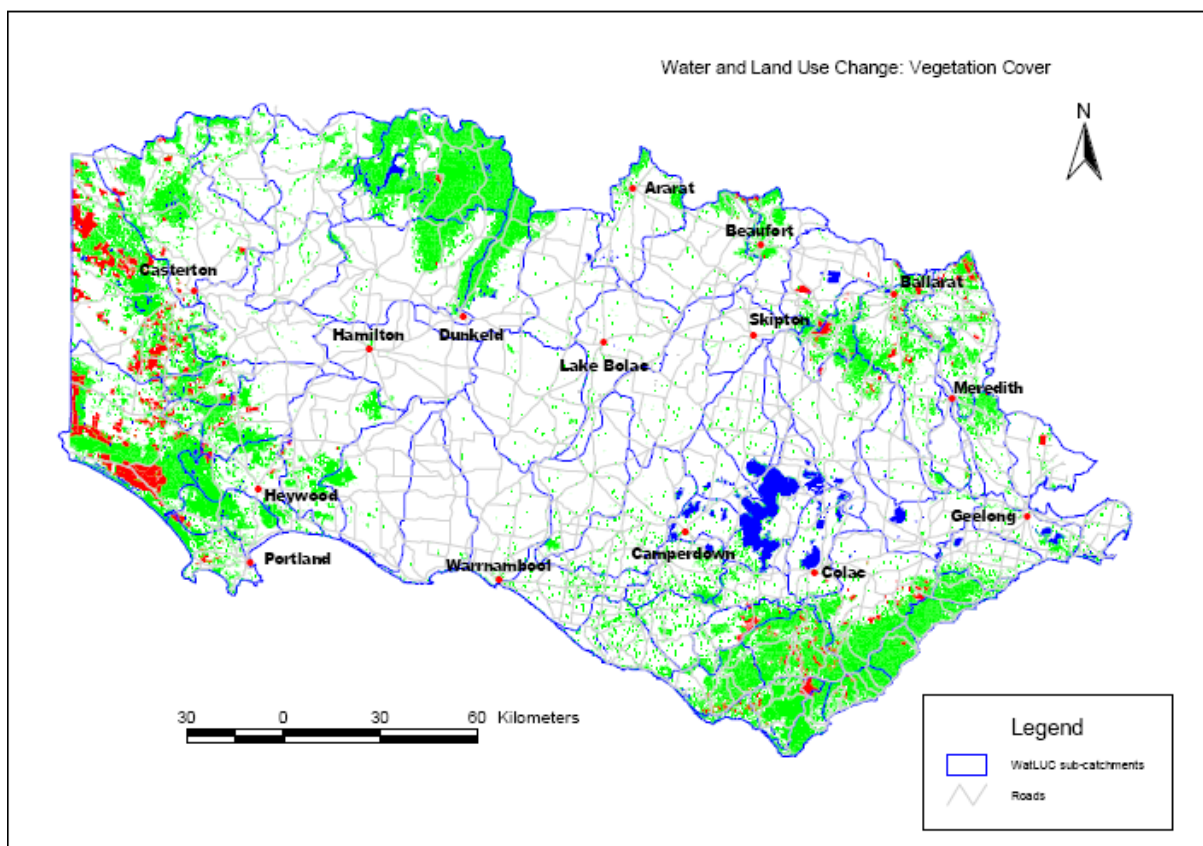
7.4 Native revegetation and conservation

In the past, large areas of native vegetation were cleared for agricultural production. At a general level, the impact on water resources was to significantly increase runoff to surface flow and groundwater resources, notwithstanding any additional diversions and extraction.

However, clearance of native vegetation has had a negative impact on other environmental values including biodiversity conservation and in some cases water quality and soil health. Widespread clearance of native vegetation is arguably unsustainable from a production perspective as well, since processes such as soil erosion and salinisation may threaten the underlying productive base of agricultural systems. As a result, there has been a concerted Government and community effort to minimise further clearance of native vegetation and to engage in revegetation initiatives.

The Glenelg Hopkins and Corangamite Catchment Management Authorities (CMAs) list biodiversity decline as a major issue, with native vegetation coverage being severely depleted.¹⁶

Figure 2. Native vegetation cover in the WatLUC study area (South-west Victoria)¹⁷



Blue areas are lakes and wetlands. Green areas support native vegetation. Red areas are hardwood and softwood plantations. Uncoloured areas are cleared land that has been mapped as not supporting vegetation.

¹⁶ See <http://glenelg-hopkinsvicgov.au.ascetinteractive.com.au/?id=nativevegetation> and <http://www.ccma.vic.gov.au/GLOBAL/uploaded/CORANG1-127.pdf>

¹⁷ Sinclair Knight Merz (2008) op. Cit., p. 17



For instance, the Glenelg-Hopkins CMA goals include:

- Restoring a minimum of 10% of each ecological vegetation class (EVC) to its pre-1750 extent – this means revegetating and regenerating approximately 1,055 hectares of priority native vegetation per annum;
- Restoring a minimum of 5% of pre-1750 cover for the majority of endangered EVCs;
- Increasing the overall cover of native vegetation to 30% of the catchment by 2030;
- Increasing the cover of endangered EVCs to at least 15% of their pre-European vegetation cover by 2030; and
- Doubling the cover of depleted EVCs by 2030.¹⁸

Although laudable, it ought to be recognised that historical reconstruction objectives such as those of the CMAs may not be practically achievable because the capacity of some landscapes to be restored to a 'pre-European' condition may be diminished, or because climate change itself produces a regional climate unsuited to pre-European EVCs. Further it should also be noted that pre-European landscapes and vegetation classes were not simply the result of species and communities present but also resulted from dynamic indigenous management.

According to the CSIRO, native forests have a much greater influence on water availability than do plantations.¹⁹ A study of the impact of land use change on water in the south-west of Victoria found that nature conservation, including all land supporting native vegetation, was the second most significant land use occupying 17% of the area.²⁰

Revegetation is likely to increase native grasslands, grassy woodlands and woody perennial vegetation. Increasing woody perennial vegetation, depending on scale, is likely to have an impact on water resources in the same direction as plantations. The scale of revegetation is important and the need for more complete water accounting for better water security dictates that this land use change be treated through the same process.

Revegetation can also be covered by contracts, agreements and covenants, which require the vegetation to be maintained in perpetuity.

7.5 Perennial pasture

Livestock grazing is the major land use across the western region. In the south-west, it occupies 65% of the land.

As the draft WRSWS notes, the proportion of perennial pastures relative to annual pastures is increasing. It is used by dairy, other cattle farmers and sheep farmers to intensify production. Deep-rooted perennial pastures such as lucerne, phalaris, kikuyu, chicory, tall fescue and tall wheatgrass use much more water than annual pastures.

The draft WRSWS notes that, on average 29,946 ha per year of annual pasture was converted to perennial pasture between 1990 and 2001; approximately 330,000 hectares, whereas the increase in Blue Gum plantations was less than 70,000 hectares.

¹⁸ Glenelg Hopkins Catchment Management Authority (2006) Glenelg Hopkins Native Vegetation Plan, [http://glenelg-hopkinsvicgovau.ascetinteractive.com.au/images/Native%20Vegetation%20Plan%20March%202006%20\(final\).pdf](http://glenelg-hopkinsvicgovau.ascetinteractive.com.au/images/Native%20Vegetation%20Plan%20March%202006%20(final).pdf)

¹⁹ Polglase, P. and Benyon, R. (2009) op. cit., p. 43

²⁰ Sinclair Knight Merz (2008) op. Cit., p. 23



This conversion has continued and the EverGraze project²¹ has been working to use perennial pasture to increase the profitability of farm enterprises and reduce recharge through significantly greater use of soil moisture (which can provide salinity mitigation benefits). EverGraze aims for recharge reductions of 50%.

There is good evidence that perennial pastures such as lucerne and phalaris use more water than annual crops and pasture. EverGraze results show lucerne and tall fescue can reduce recharge by 80 mm/yr and 60 mm/yr respectively compared to ryegrass pastures.²²

Research comparing water use for lucerne compared to wheat crop in two rainfall zones shows a much higher level of water use for lucerne. The difference in runoff between the two crops is predicted to be 75mm at 600mm mean annual rainfall and 250mm at 800mm rainfall.²³

As the WRSWS states, “pastures are planted over much larger areas than plantations in most agricultural areas.” As such, the cumulative impact of these changes on water resources can be significant.

We submit that further research is required to estimate the impact of ongoing changes from annual to perennial pasture on water systems. We add that there is no increase planned in the level of hardwood plantations and that post first harvest there may well be an overall decrease in the coming decade.

There have been few studies that have directly compared water use or recharge from pastures or annual crops with those of plantations or native forest, and particularly in rainfall zones higher than 600mm per year.

7.6 Broadacre cropping

Crop production using cereals, oilseeds, grains and legumes has expanded significantly over the past decades and is likely to continue to expand.

Annual crops are likely to use less water than perennial crops and pasture, however, the intensification of cropping and use of new technology and management systems improves output by capturing more water.

7.7 Agricultural management systems

“Management of agricultural crops and pastures can exert an important influence [on] rates of water use and hence catchment yields.”²⁴

Research in 2007 compared explored factors affecting water use by agricultural systems for 700 mm mean annual rainfall and with an annual water use of 520 mm.²⁵ Management practices such as late

²¹ <http://www.evergraze.com.au/index.htm>

²² ‘Southern Victoria’, EverGraze, <http://www.evergraze.com.au/SouthernVIC/southern-vic.htm>, accessed 31 May 2010

²³ Keating, B.A., Gaydon, D., Huth, N.I., Probert, M.E., Verbug., Smith, C.J. and Bond, W. (2002) Use of modelling to explore the water balance of dryland farming systems in the Murray-darling basin, Australia, *European Journal of Agronomy*18, 159-169; cited in Polglase, P. and Benyon, R. (2009) op. cit., pp. 47-48

²⁴ Polglase, P. and Benyon, R. (2009) op. cit., p. 48



sowing, low seeding rate, high stocking rates and intensive grazing are likely to decrease water use by up to 110mm. Site factors such as water logging, soil salinity/acidity and poor subsoil chemical properties can have the same effect.

On the other hand, early sowing, crop establishment after fallow, high seeding rates, deep ripping, deep lime/gypsum applications, rotational grazing and mounding of water logged sites can increase water use by up to 150mm.

According to a report for DPI on land use change and water policy options, “moves to lower tillage cropping can have a significant impact on run-off; future developments that encourage carbon build-up in soils as part of a greenhouse response are likely to have substantial implications for yields and for interception of surface water; raised bed farming methods can similarly alter, in quite fundamental ways, the hydrology of regions, even where the reliable on irrigation water is model.”²⁶

Intensification of cropping and farming practices, including minimum till and raised bed farming are likely to continue to expand, and increase interception of water, the magnitude of which may be potentially large.

7.8 Impacts on water resources

Acil Tasman argues that the core of the problem is that interception from land use and land management is a right implicit in land values but is not reflected in the water accounting framework and presents a case of market failure as external impacts are not factored into the costs or benefits of changes in interception. Water accounts and water management are essentially incomplete; they begin with streamflow and groundwater but do not fully include rainfall or interception.

All of these changes in land use have the potential to impact on water availability. The extent to which land use change impacts on systems which are under stress is a key focus.

The impact of land use and land management change is complex and requires an understanding of the intensity as well as scale of the impact, timing and regional and local circumstances.

Beyond select surface and groundwater areas which are under stress and impacted by land use change, empirical research has been limited and in all cases there remains a gap in modelling of land use and land management change impacts other than plantations as well as a need to improve estimates of groundwater availability and use.

Impact on surface and groundwater systems under stress

The case studies represented in the Draft WRSWS from the WatLUC study represent the ‘worst case scenarios’ in that they focus on the most significant impacts of concentrated land use change to plantations in areas where surface and groundwater systems are under stress from a range of factors, including high allocation and modification. This is not representative of the impact of plantations or other land use changes across the region, which is highly diverse, or the state but reflects complex problems in specific highly stressed areas. They do acutely represent the problem for these areas in managing a range of competing uses, which are not comprehensively covered in the water accounts.

²⁵ Benyon, R. England, J., Eastham, J., Polglase, P. and White, D. (2007) op. cit.

²⁶ Acil Tasman (2010) op. cit., p. 19



Surface water

CSIRO compiled catchment statistics for all surface water management areas where the amount of water interception by plantations is estimated to be greater than 10% of the catchment outflows. The only area listed in the western region is the Glenelg River. The information states that plantations cover about 7.7% of the catchment and have a total water interception of 125.4 GL; 19.8% of the total outflow. In addition, the diversion development level for the area is high.²⁷

Groundwater

There appears to be a local issue of over allocation of groundwater in the Hawkesdale Groundwater Management Area. "Based on CSIRO observations of groundwater use by plantations in the Green Triangle, and the area of plantations in Hawkesdale Groundwater Management Area (GMA) established with depth to groundwater <5m, SKM (2007) estimate these plantations could be extracting between 12,000 and 20,000 GL of water per annum. This means that in some parts of the Hawkesdale GMA, groundwater is effectively over-allocated."²⁸

According to the Draft WRSWS, the Hawkesdale Water Supply Protection Area (WSPA) has insufficient information but there is 4,409 ML available under the permissible consumptive volume.²⁹ However, it is reported that after taking account of groundwater recharge interception and uptake from vegetation, applications for new irrigation licences have been denied in areas where groundwater is now considered to be over-allocated.³⁰

There are groundwater WSPA's in key plantation areas which are unconfined, fully or possibly over allocated and appear to be declining such as the Glenelg WSPA.

Others are declining and fully or possibly overallocated such as Condah WSPA. The link between the condition of this system and land use change maybe more complex or weak as it is generally confined. Land use change may influence its recharge zones.

There appears to over-extraction of groundwater beyond any impact from land use change, but exacerbated by interception and uptake from vegetation. According to Polglase and Benyon, "the impacts of plantations on groundwater should take at least equal, if not higher, precedence [than surface water impacts]."³¹

These results indicate that in these cases, land use change is having an impact on water availability. These systems are stressed and there appear to be conflicts between rights to extractive use, the level of water use by land use and management and the environmentally sustainable level of consumptive use. It is also likely that reduced rainfall over the past 13 years is a key driver of resource stress.

Extent of impact: intensity versus scale

Consideration of scale and the unit of water management are key concepts. At the whole of catchment scale the impacts of plantations on water availability are minor because plantations

²⁷ Polglase, P. and Benyon, R. (2009) op. cit., p. 11

²⁸ Ibid., p. 25

²⁹ State of Victoria (2010) op. cit., p. 33

³⁰ Polglase, P. and Benyon, R. (2009) op. cit., p. 50

³¹ Ibid.



occupy a small proportion of the land surface and thus intercept small amounts of water compared to end of valley flows.

A 2009 review of the scientific assessment of regional issues and research needs for the impact of forests on water resources by CSIRO found that the “impact of plantations on water security have probably been over emphasised when considered at regional and national scale. This is especially so when considered at whole-of-catchment scale, the amount of water intercepted by plantations compared with downstream users and other components of the water balance.”³²

At larger scales, the impact of plantations is relatively low but the cumulative impact of changes to dryland agriculture may be significant. However, at smaller scales and where plantations are concentrated in individual sub-catchment the impact is likely to be much greater (e.g. in Glenelg Shire).

The Water and Land Use Change (WatLUC) study series undertaken by Sinclair Knight Merz considered 10 land use change scenarios for south-west Victoria.³³ It predicts a significant reduction in the availability of surface water and groundwater resources as the result of land use changes that occurred during the last decade and that may take place over the next 30 years. The losses could amount to between 6 and 9% of total surface water flows in the study areas and less than 1% of groundwater recharge.

What it does show is some clear areas of concern at the subcatchment level. “Around 50% of the surface water losses and over 90% of the loss in groundwater recharge would occur in the Glenelg drainage basin.”³⁴

“An empirical relationship development through WatLUC predicts that for every 10 percentage point increase in woody vegetation and perennial pasture or grassland cover within a sub-catchment, total potential water yield would fall by around 20mm/year and 2.8 mm/year, respectively.”³⁵ “However, a similar empirical relationship predicted a 0.050 reduction in the annual flow stress index for each 10% increase in woody vegetation cover.”³⁶

It is difficult to separate the impact of reduced rainfall and drought from the impact of land use change on surface and ground water resources. Research shows that site factors (soil depth, landscape position, access to groundwater, soil fertility) and management practices (spacing, pruning, thinning, rotation length and fertiliser application) could substantially affect plantation water use. These factors and timing impacts of interception are not well reflected in the modelling.

The study did not consider intensification of agriculture but it did identify widespread perennialisation including plantations, revegetation and pastures as having an impact on water availability. In particular, it looked at the subcatchment level and identified plantations and revegetation as having a relatively higher impact on yield losses.³⁷

³² Ibid., p. i

³³ Sinclair Knight Merz (2008) op. cit.

³⁴ Ibid., p. 3

³⁵ Ibid., p. 4

³⁶ Ibid., p. 3

³⁷ Ibid., p. 67



Timing of interception and groundwater use

There is scope for land use patterns to fundamentally alter the time pattern of stream flows. In some case land use and land management changes may be undermining sustainable diversion limits, minimum summer flows and have impacts on quality and reliability factors.

In particular, deep rooted vegetation are likely to extract groundwater in dry years, leading to a negative net water availability.

Although vegetation is likely to use less water in drier years, the scarcity value is higher. Acil Tasman argues that “interceptions cost most in dry years and that focusing on averages can be misleading or underestimate the value of additional interceptions.”³⁸

Regional circumstances

It is important to note that the impact of plantations and land use and land management change is not uniform across Victoria. For example, the CSIRO reports that “Recent modelling, using more realistic plantation development scenarios, indicates the potential impacts of new plantations on water allocations in parts of the Murray Darling Basin (MDB) where plantations are expanding is relatively low.”³⁹

Regional and intra-regional circumstances are likely to require different management tools, within a consistent statewide approach.

Limitations of empirical knowledge and modelling

Empirical research on the impact of land use and land management on water resources is very limited. It is mostly concentrated on plantations and in areas of high stress, for example in south west Victoria. However, it could be argued that there is insufficient empirical data underpinning modelling for most land uses and management and in most locations across Victoria.

Although, the WatLUC studies and the work of the CSIRO and others, including the Victorian Government provide data and modelling for key ‘problem areas’ in the western region that arguably provide a basis for action, the uncertainty and gaps in the science must be acknowledged.

More importantly, regional approaches to managing the impact of land use and land management change on water resources elsewhere in Victoria are likely to require much more empirical research and modelling through academic and public sources before consideration of a regionally appropriate approach.

Despite the amount of research in the western region, there remains a particular problem with the science on groundwater. “Total groundwater recharge and discharge has not been well quantified across the region.”⁴⁰

According to the WatLUC study, “it is difficult to estimate a [permissible annual volume] PAV accurately and several different methods have been used in Victoria to produce estimates that differ by order of magnitude. Comprehensive and relevant data sets are often not available.”⁴¹

³⁸ Acil Tasman (2010) op. cit., p. 31

³⁹ Polglase, P. and Benyon, R. (2009) op. cit., p. 6

⁴⁰ Ibid., p. 25

⁴¹ Sinclair Knight Merz (2008) op. cit., p. 62



In 2008, CSIRO tested the performance of three models of plantation water: SKM's SoilFlux model, a version of the 3-PG model and CABALA. "The three models were reasonably accurate in predicting annual water use of plantations not using groundwater but had poor accuracy for sites with access to groundwater."⁴²

Clearly more empirical research and modelling is required to better understand the impacts of different land use and land management changes on water resources. In particular, there is an immediate need to expand empirical research beyond plantation forestry.

7.9 Drivers of land use and land management change

Historically, land use and management has changed constantly.

The last 10-15 years has seen a change in agricultural land use and management in the Western Region, and this is likely to continue. There has been a significant shift towards perennial pasture and management systems that aim to retain and use more soil water; to increase production through increasing the input of water. There has been a re-alignment in agricultural production towards more intensive farming systems. There has also been a relatively rapid expansion of Blue Gum plantations from a very low base.

The WatLUC study identified changes in land use across south-west Victoria during the late 1990s and early 2000s as due to a range of factors, including:

- "Technological innovation in the cropping industry;
- Investment in new forestry plantations and vineyards;
- Dairy deregulation;
- Change in the relative terms of trade for various agricultural commodities;
- Growth in lifestyle land uses along the coastal strip and within commuting distance of major population centres;
- Growing environmental awareness."⁴³

In our view the important policy lesson to draw from this study is that land-use is not static, it is in fact highly dynamic. Further, even where land-use is nominally consistent, changes in management can produce very significant changes in water use and availability. One such example discussed elsewhere in this submission is the change from annual to perennial pastures within grazing systems. Such change is likely to continue as landowners and managers continue to adapt to climate change and resource condition.

7.10 Future land use and land management change without Government action

Given the policy focus on managing additional or new land use change, the likely changes in land use and land management in future are crucial to the consideration of policy design.

"Based on analysis of recent trends and discussions with various stakeholder groups, in 2005, SKM predicted that between 1990 and 2030 the area of broad acre grazing will decrease by about 1.1 Mha, dairying and cropping will increase by about 730,000 ha, plantation forestry by about 175,000

⁴² Polglase, P. and Benyon, R. (2009) op. cit., p. 26

⁴³ Sinclair Knight Merz (2008) op. cit., p. 6



ha, native revegetation by about 150,000 ha and various other land uses by smaller amounts.”⁴⁴ Based on this prediction and using the SoilFLux model, SKM estimated that by 2030, total surface water will have decreased by 6%-9% compared to 1990 and groundwater recharge by <1%.

According to the WRSWs, doing nothing about these impacts will have the following consequences:

- “In some areas, groundwater and surface flows will decline
- Water for licensed and domestic and stock uses will be restricted, and these water users will be faced with increasing costs
- The environment will suffer
- The risks of reduced water availability will not be shared equally.”⁴⁵

According to the WatLUC project, “over the coming 30 years, broadacre cropping is the only major land use expected to continue to expand at close to its recent historical rate.”⁴⁶ The trend towards new agricultural management systems and pasture systems that capture more water are also likely to continue.

Conservation and revegetation are also likely to continue to expand, driven by the revegetation targets in Regional Catchment Strategies. There is also some support for these activities through market-based initiatives, including the EcoTender program.

Future expansion of forestry has been largely overestimated. There is only likely to be incremental expansion in the Blue Gum plantation estate. In 2009, the area of plantations increased by about 3,000 hectares across the whole of Victoria.⁴⁷

There is further potential for carbon planting in the Western Region, noting that to date activity has been small and not located in the wetter (south-west coast and otway) sub-regions. It is difficult to see pure carbon plantings at scale being viable in these wetter regions. In the longer term biofuel plantings may eventuate. The policy and market incentives are not there. Carbon plantings may expand in the future but in the immediate policy environment, the incentives for carbon and environmental planting have been undermined and there is significant uncertainty.

Land uses and management are likely to change as landowners and manager adapt to climate change and variability in the future. Some activities may become more or less viable. It is important that the need to adapt to the impacts of climate change and more realistic estimates of timber and carbon plantings are incorporated into policy considerations for managing the impact of land use change on water resources.

Even though the South-west is regarded as a single region from a management and strategy viewpoint it is essential to recognise that biophysically the region is diverse containing very significant environmental gradients. There is a risk of creating perverse outcomes because of the existence of localised pressure points within the region.

⁴⁴ Polglase, P. and Benyon, R. (2009) op. cit., p. 25

⁴⁵ State of Victoria (2010) op. cit., p. 146

⁴⁶ Sinclair Knight Merz (2008) op. cit., p. 2

⁴⁷ Bureau of Rural Sciences (2010) Australia’s Plantations: 2010 Inventory Update, Department of Agriculture, Fisheries and Forestry, http://adl.brs.gov.au/data/warehouse/pe_brs90000004201/NPlupdate2010_20100525_ap14.pdf



7.11 Wider impacts of land use and land management change

It is also important to consider the wider impacts and benefits of land use and land management change and that increasing interception can be positive as well as negative. Victorian Government commitments and policy principles require that the impacts of land use change be considered in conjunction with their benefits to the community.

Socio-economic impacts

A large project has been undertaken on the socio-economic impacts of land use change in the Green Triangle and Central Victoria.⁴⁸ Impacts include changes in population, employment, income, demand for services and infrastructure. In addition to changes in agricultural production, including plantations, the study considered the increase in rural residential populations.

The forestry industry is a significant contributor to the regional economy. Employment is created in forest management and in downstream processing and associated industries. There are significant processing facilities in Portland and Colac and approximately 1.2 million tonnes of pine woodchip is exported annually to international markets through the Port of Portland.

Forestry in the Green Triangle (including South Australia) contributed over \$778 million to the areas gross regional product directly and indirectly in 2003/04. This is equivalent to 16% of the total economy of the regional, and 30% of total primary industry production. Directly and indirectly the industry supports the employment of 8,765 people.⁴⁹

Changes in farming practices including use of new management systems, technology and switching to perennial pasture can significantly improve farm profitability. EverGraze aims to increase farm productivity and profitability. The farm sector, including dairy, livestock production and cropping are fundamental to the economic and social fabric of the western region.

Environmental impacts

There is a need to recognise that land use change can also be associated with positive environmental externalities such as soil health, reducing water tables, salinity, biodiversity and carbon management. "As long as aspects of these markets are also less than ideal in posting price signals that correctly reflect actual system costs and benefits, then there are risks that well-intentioned intervention could actually make matters worse."⁵⁰

Greenhouse

Forestry is the only sector of the economy which is greenhouse positive. The expansion of plantation and farm forestry, revegetation, conservation and environmental plantings for carbon sequestration provide enormous greenhouse mitigation benefits.

This can be contrasted to agricultural and industrial production in the region, which are net emitters of greenhouse gases.

⁴⁸ See <http://www.landusechange.net.au/>

⁴⁹ Green Triangle Regional Plantation Committee, <http://www.gtplantations.org/>, accessed 14/6/10

⁵⁰ Acil Tasman (2010) op. cit., p. 19



Biodiversity conservation

Conservation and revegetation primarily aim to restore degraded landscapes and enhance biodiversity values. They are undertaken strategically to maximise community benefit.

Plantation forestry, farm forestry and environmental plantings for carbon sequestration can also provide biodiversity benefits and improved habitat for native species relative to the previous land use. Such benefits may be maximised where plantings are undertaken for multiple benefits (i.e. wood and biodiversity or carbon and biodiversity).

Salinity mitigation

“Salinity is one of the major water quality problems in the region.”⁵¹ Although some parts of the western region are naturally saline, the clearing of native vegetation for settlement and agriculture, irrigation and climate variation have caused groundwater levels to rise in some areas and saline discharges to affect agricultural product, river health and biodiversity.

Planting trees and other deep-rooted vegetation to limit the mobilisation of salts stored in soils by controlling water tables is one way to mitigate salinity. “In some areas at least, planting of trees has been send as a valuable part of a strategy to address rising water table and salinity/waterlogging problems, effectively reversing the trend that occurred with an earlier conversion from forestry to pasture and crops.”⁵² Perennial pasture can also be used and the EverGraze project aims to reduce salinity through use of perennial pasture systems.

In general, studies on the impact of land use change on water yield have not examined the impact on salinity mitigation. “The impact of land use change scenarios on the incidence of dryland salinity in the WatLUC study area has not been explicitly investigated. However, the estimated reductions in recharge in many of the regions’ dryland salinity hot spots may help to slow the development of dryland salinity.”⁵³ One of the recommendations for further work from the WatLUC study is to evaluate the implications of land use change for land and water salinity in regional priority areas.

Water quality

One of the recommendations from the WatLUC study is to evaluate the water quality implications of land use and hydrologic change. Many river catchments in the western region are highly modified by the removal of vegetation and intensive land use. Salt, sediment and nutrients such as nitrogen and phosphorus are the main contaminants.

Many of the catchments have less than 10% of the length of rivers and tributaries in good or excellent condition according to the index of stream conditions.⁵⁴

The balance or trade off between water use and the benefits to all uses is a fundamental weakness in the WRSWS and consideration of policy on land use change and water to date. There is extensive research reports and material that confirm and provide guidance in how perennial vegetation can restore and benefit all users of a particular water resource. These issues must be considered carefully in any policy developed.

⁵¹ State of Victoria (2010) op. cit., p. 65

⁵² Acil Tasman (2010) op. cit., p. xviii

⁵³ Sinclair Knight Merz (2008) op. cit., p. 4

⁵⁴ State of Victoria (2010) op. cit., p. 40



8. Issues for policy development

Based on the research and policy analysis available, we believe that the development of appropriate policy for managing the impact of land use change on water resources in Victoria must be based on consideration of the following issues. They should also guide policy development.

8.1 Interception is not included in water accounts

Interception of rainfall and use of groundwater by vegetation is not currently included in the water management accounts. As a result, accounts are incomplete and significant impacts may undermine sustainable allocation and management of water for other users, including the environment.

The Acil Tasman report to DPI stated, “Rainwater that has not yet entered streams and groundwater is not currently recognised in the water accounts; there are largely unregulated rights to access groundwater using vegetation, even where other forms of access are heavily regulated; in some cases there exist up to three separate and conflicting sets of ‘rights’ to access the same water.”⁵⁵

8.2 The NWI requires management of additional interception in fully and over-allocated areas

The NWI requires jurisdictions to manage the impact of significant interception activities in water systems that are fully and over-allocated. Additional proposals are required to be subject to management (entitlement).

The NWI covers all interception activities and this includes both changes in land use and land management, as acknowledged in the Draft WRSWS and the work on Action 2.20 by DPI.

As indicated above, Victorian Government policy positions and commitments require that management apply to new land use change rather than existing land uses (which should be considered as the baseline) and it should apply equitably across all land uses. Such an approach supports policy to manage water rather than land use activities.

8.3 Rights for water use by land use exist

Land uses which currently intercept water have implied rights to that water use. Current plantations in the Western Region, comprised of long established pine crops and more recent Blue Gum and Farm Forestry plantings should all be regarded as existing rights with respect to interception, just as they are regarded as as-of-right agriculture on rural land in the state planning scheme (the latter confirmed in the TIS).

The Acil Tasman review of policy options to management the impact of land use change on water resources argued it would be “simplistic to view land use trends as ‘unfairly’ taking water from other uses.”⁵⁶ It stated “Landowners have typically paid for rights to change use/interceptions; attenuation of these rights, to prevent the attenuation of other rights, could equally be viewed as unfair. The problem lies more fundamentally in the coexistence of conflicting rights.”⁵⁷

⁵⁵ Acil Tasman (2010) op. cit., p. vi

⁵⁶ Ibid., p. vi

⁵⁷ Ibid.



The report argues that conflicting rights are held sometimes for the same water by interceptors, extractive users and the environment. This could equally be extended to domestic and stock users, who have rights but whose use is increasing and is only reflected to a limited extent in water accounts.

The Acil Tasman report argues that interception rights currently exist but they are in many cases, inconsistent with the approach used to manage streamflows and groundwater directly.

Acil Tasman argues that rights to pump groundwater via vegetation is unregulated and despite the case being less clear cut than for interception of rainwater, “rights to access this water do currently exist, have largely been capitalised into the value of the land with which they are still bundled, and in many cases will have been paid for by current land owners.”⁵⁸

Even if the rights have not been fully exercised, they exist and have option value for landowners, including those with annual pasture who might plan to move to perennial pasture or woody vegetation in the future. This is demonstrated by trends in land use. Acil Tasman argues unexercised rights to intercept are akin to ‘sleeper’ or ‘dozer’ extractive rights,⁵⁹ which the WRSWS pledges to respect.

Currently rights to interception are bundled with land and landowners have no incentive or penalty to consider the impacts of their interception on water values elsewhere in the system.

8.4 There are number of surface and groundwater systems under stress

A number of surface water and ground water systems in the western region appear to be under stress; that is fully or allocated relative to the environmentally sustainable level of use and in some cases allocations are based on estimates which are not reliable.

As the WRSWS acknowledges, reduced rainfall over the past 13 years has been a major factor.

Historical over-allocation as far back as the 1960s and incomplete knowledge of groundwater systems on which to base extraction, and ignorance of interception in water movements are likely factors.

In addition, pressures from water uses not fully captured in the water accounts including domestic and stock use and use of water by land use and management are likely factors in some cases.

8.5 Land use and management change impact systems under stress in a small number of localities

There is evidence that additional stress placed on a number of groundwater systems by land use change through direct extraction and interception of recharge.

In addition, there appears to be a cumulative and localised impact from land use change on surface water in a small number of localities.

⁵⁸ Ibid., p. xvi

⁵⁹ Ibid.



Despite some uncertainty, there also appears to be sufficient information to act to address specific areas of concern where land use changes are placing additional pressure on stressed systems and further land use change would likely contribute to the decline of these resources and undermine other water users, including the environment.

However, the impacts are not uniform and highly dependent on the mix of land uses, geographic and management factors. Notable impacts are limited.

There is no case for a statewide regulatory framework.

Indeed, there is also no case for a regionwide regulatory framework. However, there may be a case for a targeted policy response in problem areas, within a consistent statewide approach.

According the DPI tender for an analysis of policy options (won by Acil Tasman): “To account for a range of situations throughout Victoria, a collection of policy instruments and/or sufficient flexibility within policy instruments is likely to be required. However, a state wide approach should still be defined ... State-wide principles will enable the provision of a consistent strategic direction while ensuring the application of particular instruments is done so on a region specific basis.”⁶⁰

8.6 Problems of over-allocation must be resolved first

However, there appears to be a problem of both surface and groundwater over-allocation in some localities, particularly when the impact of existing land use, impacts of potential land use change, extractive allocations, domestic and stock use and environmental requirements are combined.

Agreement on targeted areas must be supported by science and consultation

The WRSWS suggests areas of high priority. The list is a useful starting point. However, there is a need for better hydrological information and mapping, particularly of groundwater.

In particular, there is a need for appropriate and transparent scientific assessment of the sustainable level of water use.

The burden of bringing the system back into balance should be shared by all water users

Where rights for interception and use of groundwater by vegetation are clarified, they should be included in the burden sharing arrangements.

The Acil Tasman report argues that “It may be less costly to source a reduction in interception out of current uses than just focusing on limiting future growth.”⁶¹

This argument may have merit where rights for interception are clarified and the Victorian Government seeks to address overallocation as per an appropriate risk sharing framework. The precedent set by the Federal government is to purchase water rights. We believe that there may be opportunities for the Government to purchase interception and/or extractive rights to alleviate situations of overallocation.

⁶⁰ Department of Primary Industries (2008) RFT Part B Specification for: Impact of land use change on water resources – Policy analysis and development

⁶¹ Acil Tasman (2010) op. cit., p. vi



The proposed South Australian approach of treating subsequent rotations of existing rotations as a change in land use and therefore a basis to reduce the water allowed to be used by the plantation estate is inconsistent with the intent of the NWI to address new proposals and highly discriminatory. A policy to treat all land uses equitably would dictate that annual crops and pasture then constitute a change in land use, which is of course, not the case set out in the SA proposals.

A poor policy outcome would be the development of burden sharing arrangement that undermined the value of land and investments for forestry and other agricultural land uses.

8.7 Forestry is only part of the system

Despite, forestry receiving the most focus in research and policy discussions, it is only part of the system.

The Acil Tasman report, puts it well. “While forestry has been seen as the ‘culprit’ in much of the policy debate, it is crucial to sound policy development that its significance be kept in perspective;

- Moving from annual pasture to forestry does represent the large shift in average interceptions on a per hectare basis; and
- The limited flexibility that water resource managers have to influence interceptions by trees at critical times may well mean its effective impact and the depth of the associated legitimate policy concerns are even greater than is indicated by average interceptions; but
- The area devoted to plantation forestry remains small compared to pasture and cropping and shows clear signs of being limited by competitive demands for land;
- Continuing steady trends in land management within and between uses other than forestry could well account for a greater trend rise in intercepted volumes than would likely trends in forestry, where there are indications of declining competitiveness for land relative to strong demands from other agricultural uses.”⁶²

Equitable treatment of all land uses

Victorian Government policy is clear that in addressing the impact of land use change on water resources, the Government will not discriminate between land uses.

That means all forms of land use and land management interception should be considered under any management approach.

This is consistent with sound policy given the trend toward perennial vegetation (including trees, pasture and grasses) and towards technological and practice change to capture more water on-farm. However, it should be noted that future expansion of the plantation estate in the Western Region is likely to be small.

8.8 Significance must be measured in terms of scale as well as intensity

As discussed above, it is important to distinguish the scale of impact from intensity.

As the Acil Tasman report states, “the cumulative scale of trends into higher yielding and more drought resistant pasture and crop species from alternative crop and pasture management systems could exceed those of forestry in many areas.”

⁶² Ibid., p. xvii



We believe there are a number of related considerations:

- The unit of measurement
The impacts at catchment scale are likely to be minor relative to the impacts at subcatchment or aquifer scale. The latter may be the more appropriate unit of management.
- The threshold
Sustainable diversion limits may or may not be set at the appropriate level. They also do not take into account the water use by existing land uses.
- Significance is relative
Where a system is fully or over allocated and under stress, any sizeable and possibly incremental at scale land use is likely to have a significant impact. The current mix of land uses must be taken into account. The net benefits of any land use change must also be considered.

8.9 Flexibility and timing are important factors

The effects of land use change on the timing of inflows to streams and groundwater – both the annual cycle and the correlation with extreme dry periods – is of central importance to the development of interceptions policy. Land use patterns can affect timing as well as the average volume of ‘downstream’ flows, with the timing concerns sometimes dominating and being hardest to manage.

Land use and land management change affects water resources first, prior to extractive or environmental use. Its impact can vary with vegetation age, water availability, management practices and site factors. It is also relatively inflexible once vegetation has been established.

Clarifying rights therefore requires careful consideration because interceptions by vegetation cannot be flexibly, economically and rapidly regulated to protect other rights.

In some cases, such as revegetation or carbon offset projects there may also be legal and financial penalties involved.

This distinguishes interceptions from extractions.⁶³ It is particularly important in the context of future climate change and variation. This supports a case for adaptive management and flexible arrangements.

8.10 The baseline must not be retrospective

The NWI and Action 2.20 commit to managing new interception activities. We note that, to estimate the interception effect of a land use change, it is necessary to understand the water use of the previous land use as well as the new land use. Moreover the production system associated with the land-use at that point in time would have to be considered.

Expansion of plantations in Victoria since 1997 has been underpinned by a national plantations policy (‘Plantations 2020’) supported by State Government policy (e.g. ‘Priorities for Action: Victoria’s Private Forestry Industry 2005–2008’ and, most recently, by the ‘2009 Victoria’s Timber Industry Strategy’). The plantation timber industry contends that retrospective application of water policy would unfairly penalise a sector whose investment in expansion has been driven by a shared

⁶³ Ibid., p. 40

goal of government and industry to increase the area of plantation resources to enhance the international competitiveness and sustainability of the sector.

The plantation timber industry is **adamant** that there is no basis to penalise existing plantations with the application of new water policy. The reasons are:

- Many plantations have been a continuing land-use for decades and re-investment decisions, including expected recurrent costs, in a large proportion of existing plantations were made years ago.
- Existing plantations contribute to processing industries, many of which have long-term agreements for wood supply based on existing plantation resources.
- Plantations contribute a wide range of environmental outcomes not provided by agricultural land-use.
- Consistent with NWI and Action 2.20.

An important aspect of policy implementation is the baseline for the start of the policy and transitional arrangements to facilitate the policy in accord with underlying principles (e.g. equity, policy consistency). We believe the options for setting a baseline are:

- From the date of policy promulgation.
- From a future date (e.g. 2012) nominated when the policy is promulgated.

We believe that, given the complexities involved in fully developing the policy for managing the impact of land use change on water resources, setting a baseline date that allows more time to resolve key methodological issues would be beneficial.

Transitional arrangements for policy implementation

An overlay of the baseline for policy implementation is the issue of transitional arrangements. Such arrangements should mitigate the occurrence of unintended consequences of any policy change given that there remains considerable uncertainty about the extent and scale of the impacts of water interception caused by land-use change.

In particular, a step-wise policy approach, with options available may be appropriate.

For example, clarification of rights, addressing situations of overallocation and developing regionally-appropriate policy measures to manage land use change in identified 'stressed' catchments may be a logical pathway.

8.11 *Benefits of land use change to the community must be considered*

As discussed above, land use change can provide socio-economic and environmental benefits to the community. In this context and in the sense of deriving greater value from a scarce resource, some land use changes that increase interceptions will be desirable and sound policy will not be just about limiting interceptions.”⁶⁴

8.12 *There are key areas of uncertainty*

Our current understanding of the impacts of land use change is minimal at best. The Victorian plantation industry has been a strong supporter of research into the impacts of plantations on water

⁶⁴ Ibid., p. xiv



use availability and is committed to better understanding the impact of plantations on the water resource but it is only one piece of the overall water budget picture. There is a clear case for additional hydrological information and for more research on the impact of land use changes.

The need for a better understanding of all water users outside the water entitlement framework is required to ensure all water users are treated equitably and the resource is sustainability managed.

As discussed above, there is a need for better hydrological mapping of groundwater resources as well as research on the impact of land use change on groundwater resources.

Given the presently unavoidable uncertainty about the assessment of actual interceptions, there is strong cause for proceeding with caution and managing the impact of high costs associated with policy interventions. The risks associated with intervention can be managed through targeting intervention at the source of the problem.

Managing uncertainty and risk

According to Acil Tasman, “it would be a mistake to look to either a ‘one size fits all’ intervention, or to use an intervention that is rigidly introduced on a ‘once and for all time basis’. An efficient policy, given the uncertainties that need to managed, vary in its detail across regions, reflecting local hydrology and other factors, and will be designed for flexible adaptation over time in line with growing knowledge.”⁶⁵

We believe this to be the right approach.

Sound policy should allow landowners to manage the opportunity costs and risks of their activities, whilst providing security over their property rights.

Action should be consistent with principles for efficient and equitable policy on land use change and water

9. Approaches in other jurisdictions

Managing the impact of land use change on water resources is relatively new. It is useful to consider the approaches taken in other jurisdictions on this issue and implementing their commitments under the NWI. Progress has been slow, undoubtedly due to the scientific and political complexity of the issue.

The WRSWS summarises a number of approaches and also suggests Victorian policy should be complimentary with that in South Australia. Groundwater resources along the Victoria – South Australia border are connected. The resource is managed through an inter-state agreement to share the connected resource. However, the WRSWS overstates the progress made in South Australia.

Appendix 2 reviews the approaches to managing land use change and interception in Western Australia and South Australia.

⁶⁵ Ibid., p. xxi



9.1 Western Australia

The approach under development in Western Australia is still in its early stages. It has been proposed that:

- All existing plantations (at the time of legislation) will not need to be licensed, but may obtain a licence on application if they wish;
- Where new plantations have an environmental benefit (e.g. ameliorate salinity) they will not require a licence;
- Where water demand is high new plantations would have to compete for water on the same basis as all other users;
- Second and subsequent rotations would not be considered a change of land use, (i.e the original water licensing arrangement for the plantation would continue) but adjustment of area may be necessary if there have been reductions in the consumptive pool over the life of the previous rotation;
- Clarification of the methodology to be used in situations where the consumptive pool is reduced by decreasing rainfall to ensure that plantation water use is reduced proportionately with other users;
- Where competition/demand for water is low, new plantations will not need a licence; and
- Advisory boards to be restructured to represent the wider range of stakeholders.

Many of the complex methodological issues remain to be resolved as the approach is developed but the principles reflect a measured and targeted approach, which is broadly supported by the industry in Western Australia. It should be noted that the principle of equal treatment of all land uses supported by the industry.

9.2 South Australia

Developments in South Australia on policy covering plantations and water use have been continuing at both the state and regional level. They reflect an attempt to move quickly by targeting plantations only and without consistency with provisions of the NWI.

South Australia is developing a statewide policy framework, which provides options for managing water use by plantations through the entitlement or planning framework. This policy framework remains under consideration.

In south-east South Australia, the Natural Resource Management(NRM) Board, developed a NRM Plan which identifies plantations as a water affecting activity, sets a threshold for the region for plantation water use (59,000 hectares) and requires plantations to obtain a licence (on the market) for water use beyond the threshold.

The Draft Lower Limestone Coast Water Allocation Plan, goes much further and proposes:

- All plantations that are located in areas with shallow groundwater (<6m) must have water entitlements.
- Existing second rotation plantations will be granted a permanent water entitlement.
- First rotation plantations will receive temporary allocations. This applies mainly to blue gum plantations and allows water entitlements to go back to the consumptive pool for reallocation to other users if the plantation development does not continue into a second rotation.
- All future plantations will require a water allocation. Water can be accessed on the water market or through allocating unused forestry threshold (if available).



The forestry industry in South Australia has been extremely concerned with these proposals due to their retrospectivity, lack of consideration of positive environmental benefits, use of assumptions and methodologies which do not reflect the level of uncertainty in the data on which they are based or allow for an appeal mechanism, the lack of appropriate consideration of significance, discrimination against plantations relative to other land uses and the lack of equity. South Australian policy is not considered compliant with the NWI.

Partially in response to these issues, the South Australian government established in February 2010 a small taskforce of key Government agencies and members of the South East NRM Board to undertake a technical review of the hydrological science of interception activities and a cost-benefit analysis of different policy scenarios. It will be important for this process to address many of the outstanding issues with the draft Lower Limestone Coast Water Allocation Plan and provide opportunities for adequate consultation and input from the forest industry as a key stakeholder.

The SA policy arrangements are seen by the forestry industry as a negative and inequitable policy approach and to set a potentially damaging policy framework precedent for Victoria SWS processes and other State's processes around Australia. It should also be noted that "the climate and hydrology is more complex and diverse than on the SA side of the border."⁶⁶

The desire for a certain amount of consistency between policy frameworks and implementation especially between regions and catchments located on adjacent State borders is understood. However the forestry industry sees that an efficient and equitable policy framework can be complimentary, it does not however have to be the same or similar, especially in light of the many different regional differences between the different jurisdictions, that is '*one size does not fit all in this debate*'.

10. Assessment of policy and management approaches

The WRSWS argues that doing nothing is not an option. In a number of specific cases, there does appear to be sufficient information about the impact of land use change to develop a management approach. However, any policy and management approach must be developed through a careful and rigorous process to achieve an efficient and equitable outcome.

It also makes some useful points about what approach might work for Victoria. That is:

- an approach should allow for further policy development (adaptive management);
- targeting the water resources at risk and the source of the problem;
- efficient policy and regulation to minimise perverse outcomes and reduce the burden of regulation;
- balancing comprehensiveness with simplicity; and
- considering a package of options, including potential building blocks for policy development.

In principle, these are considerations applicable to many policy challenges. We believe they are also consistent with the discussion above and with considerations expressed in the Acil Tasman report.

The Draft presents eight management options:

- *Collaborative approaches*
- *Recording significant land use changes and water use*
Requiring referrals under land use planning
- Environmental significance overlay

⁶⁶ Polglase, P. and Benyon, R. (2009) op. cit., p. 25



- Zoning
- *Declaring special areas under the Catchment and Land Protection Act 1994*
Integrating interception into water resource management
- Accounting for water use
- Registering land use changes
- Licensing water use

In essence, we believe these are policy options that would be considered at the regional level, following the development of a statewide approach to clarifying rights and addressing areas of overallocation. We believe that different approaches may be appropriate for different regions and that tools may be used in combination.

It is useful to explore the applicability of these approaches for the western region, but keeping in mind that action is only likely to be required in targeted areas and different approaches and options may be applicable in other parts of Victoria.

It should be noted that we consider these options to present early thinking as any option or package of options will require significant development before it can be fully considered.

10.1 Collaborative approaches

At this stage, collaborative approaches are not well defined. We do not believe that this option is capable of addressing the problems of areas in 'stress'.

10.2 Recording significant land use changes and water use

Mandatory recording of land use changes and water use could support better estimate of impacts on water resources, including at location and at scale.

It would also support better knowledge on which to base policy actions. However, it would not limit water use and is potentially best considered in areas which are not currently considered stressed or in combination with other measures.

10.3 Requiring referrals under land use planning

Any planning approach must recognise plantations as an as-of-right crop and treat plantations equitably with other land uses. That means, any planning trigger must apply to other land uses and management. It should be transparent and consistent.

Environmental Significance Overlay

This option appears limited and potentially highly subjective. It is not clear how it would be applied consistently, provide security to landowners or provide an outcome which could deliver water security. We do not support this option.

Zoning

The WRSWS suggests that a schedule to the Farming Zone could be modified to identify areas vulnerable to water interception by water-affecting activities such as plantations and other-deep



rooted vegetation. No permit would be required outside these areas. A threshold could be used within the schedule to limit permits. This would provide a targeted response.

We agree that 'water stressed areas' would need to be transparently and clearly defined and include use by existing land use activities. It is fundamentally important that this option not be a bandaid solution to responding to historical overallocation or long term changes in the water availability.

This approach manages the activity rather than the water. We also agree that to be equitable, this approach would need to include all water uses, including revegetation projects and implementation of perennial pasture systems.

This option raises a number of questions:

- How would water stressed areas be defined?
- What weight will be provided to land use intensity as opposed to scale?
- What transaction costs might be imposed on landowners?
- How would wider environmental benefits such as carbon sequestration and biodiversity be considered?
- What assumptions and methodologies would be adopted?
- Will offsets be allowed?
- Would there be scope for an appeal mechanism based on:
 - Independent evidence on the likely impact on water yield?
 - The net benefits provided by the land use activity?

We are cautious about the applicability of this approach and believe this option requires further consideration and elaboration.

10.4 *Declaring special areas under the Catchment and Land Protection Act*

The declaration by the Minister of water stressed areas as 'special areas' and the application of stringent conditions on land use and land management may have a similar impact to zoning. Both approaches manage the activity rather than the water.

The impact of reform of institutional arrangements for regional natural resource management under the Land and Biodiversity White Paper need to be considered in assessing this option.

It would essential that conditions apply to land use and land management change rather than retrospectively applying conditions to existing use.

It may also be administratively costly and lengthy to implement and to administer applications.

It raises the same questions as above for zoning, and:

- Will it only apply to new land use and management changes?

We are concerned that without offsets and flexibility mechanism, this approach (and zoning) could simply regulate to prevent land use change or allow many small water users at the expense of large water users rather than allow water to flow to higher value uses. This could be a poor policy outcome.

We are cautious about the applicability of this approach.



10.5 Integrating interception into water resource management

Integrating interception in water resource management would be a policy to manage the water rather than the activity and therefore a more direct approach. It may also facilitate water use according to the highest value rather than first movers or many small interceptors at the expense of more intense ones.

Accounting for water use

We are supportive of estimating water use from ALL land uses and including that water use in caps for surface water and groundwater systems.

We agree that this is a first step measure that may be applied in combination with others, where appropriate or as a system of monitoring in areas that are not currently stressed.

Accounting must not discriminate between land uses. There should be full consultation on what land uses are included in the accounting but it must be sufficient to pick up intensive and cumulative impact of large scale changes.

Water users must have a role in consultation on the accounting methodology.

Registering land use changes

We are broadly supportive of a registration system that would record and track ALL land uses over time and allow interception to be incorporated into water accounting. It could also be relatively cost efficient and transparent.

We believe that a registry could be one mechanism for clarifying existing rights to interception. It could also provide a basis for an entitlement system in the future, which would support the flow of water to its highest value use.

Voluntary registration could be a step towards mandatory registration, however, if licensing or entitlements were considered likely, registration would need to become mandatory.

However, there are number of considerations:

- Would a baseline apply for future progressions to water entitlements or licensing to protect existing land uses?
- How would all significant land uses be captured (includes revegetation, perennial pasture, plantations)?
- What assumptions and methodologies would apply?

Licensing water use

The WRSWS proposes a cap on interceptions could be introduced and it could be coupled with a mechanism to declare 'areas of intensive management'. Licensing could create trading options by establishing a formal water entitlement.

We believe that there are opportunities for interception policy to transition to licensing.



However, as the WRSWS articulates, “the framework must be based on sound and defensible estimates of water use.”⁶⁷ At the moment, our understanding of the impact of land use change on water resources remains limited – particularly for land uses other than plantations and for groundwater.

We also believe the following issues require serious consideration:

- In the western region, how much water could be included in an interception cap, above the water currently intercepted by existing land uses?
- Given that land uses such as plantations are highly inflexible, what would be the nature and reliability of an interception entitlement?
- What would be the technical basis underpinning an entitlement system and how would improvements in knowledge be treated?
- How tradeable would entitlements be given that there is limited trading in extractive entitlements in the western region and depending on the existing entitlements and the cap, the number of sellers could be small and the physical constraints significant?
- What conditions would apply to trade?
- How could such markets link to or undermine other markets, such as carbon markets?

11. Conclusions

We believe that the range of options presented in the WRSWS offer pathways forward for the Victorian Government to work with all stakeholders to deliver a policy that is targeted, equitable, minimises the regulatory burden and maximises the value of water use to the community.

On balance, the options presented under the water resource management framework provide a more efficient and equitable approach. This framework also lends itself to a progression over time, which will benefit from improved monitoring, knowledge, technology and development of water trading in the western region.

We believe that a multi-layered approach is necessary so that there is a statewide policy approach but measures are regionally-appropriate and targeted.

The complete development of a policy will require significant further work and we as an industry are committed to working with the Victorian Government in this process.

In addition, we believe that there is significant technical work required to underpin the development of this policy, including:

- Assessment of the impacts of land use and management change on system hydrology for a broader range of land uses;
- Assessment of actual impacts of land use change and management through empirical research and examination of the impact of management and site factors;
- Improved hydrologic mapping of groundwater resources; and
- Improved modelling of groundwater use by deep-rooted vegetation.

⁶⁷ State of Victoria (2010) Draft Western Region Sustainable Water Strategy for Community Comment, Victorian Government Department of Sustainability and Environment, <http://www.ourwater.vic.gov.au/programs/sws/western/copy-of-draft-strategy>, p. 164



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State of Victoria (2004) Securing Our Water Future Together, Victorian Government White Paper, http://www.ourwater.vic.gov.au/_data/assets/pdf_file/0003/12783/Chptr2.pdf



Appendix 1. National and Victorian Policies relating to Land Use Change and Water

There exist policy commitments at the National and Victorian levels which provide a framework for addressing land use change and impacts on water resources. This policy framework is must be reconciled in developing an approach for the Western Region SWS, which will have applicability for other regions in Victoria.

We recognise that the Draft Western Region SWS includes a brief summary of these policy commitments but that the policy principles have not been reconciled as a set of criteria for a regional or a Victorian approach.

The forest industry is cognisant of these policy linkages and understands that in addition to the state level *Our Water, Our Future* initiative⁶⁸, the draft Western Region SWS will, to some degree, set a precedent in the interpretation and implementation of sustainable land use and water policy principles and plans in Victoria, and potentially elsewhere. It is important that the development of the Western Region SWS build on these high level principles and, where appropriate, improve on them in relation to such issues as interception and the equitable treatment of regional land use(s).

National Water Initiative

The National Water Initiative was agreed in 2004 and is intended to support and monitor progress toward a broader water policy framework, including important aspects related to forestry and other rural land use such as risk sharing, water planning and interception.

Paragraphs 55 to 57 set out the requirements for treatment of interception.⁶⁹ The key points are:

- A number of land use change activities have potential to intercept significant volumes of surface and/or ground water. Examples include but are not limited to farm dams and large-scale plantation forestry;
- A recognition that if these activities are not subject to some form of planning and regulation, they present a risk to the future integrity of water access entitlement and the achievement of environmental objectives for water systems;
- The intention is to assess the significance of such activities on catchments and aquifers, based on an understanding of the total water cycle, the economic and environmental costs and benefits of the activities of concern, and to apply planning, management and/or regulatory measures where necessary;
- Measures to implement the NWI are based on the level of water allocation:
 - In water systems that are fully allocated, overallocated or approaching full allocation, significant interception activities should be recorded (e.g. through a licensing system). Proposals for additional interception activities above an agreed threshold size, will require a water access entitlement;
 - In water systems that are not yet fully allocated, or approaching full allocation, significant interception activities should be identified, estimates made of the

⁶⁸ State of Victoria (2004) *Securing Our Water Future Together*, Victorian Government White Paper, http://www.ourwater.vic.gov.au/data/assets/pdf_file/0003/12783/Chptr2.pdf.

⁶⁹ Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory (2004), <http://www.nwc.gov.au/resources/documents/Intergovernmental-Agreement-on-a-national-water-initiative.pdf>



amount of water likely to be intercepted by those activities, threshold levels calculated for allowable water use without an entitlement and water systems monitored; and

- Measures must be implemented no later than 2011.

As stated in the Draft Western Region SWS, implementation of the NWI requires:

- Identification of current and potential activities that could interception significant volumes of water. The definition of significance is a key consideration.
- Establishment of [water use] threshold levels to trigger the use of water access entitlements. “The threshold size will be determined for the entire water system covered by a water plan, having regard to regional circumstances and taking account of both the positive and negative impacts of water interception on regional (including cross-border) natural resource management outcomes (for example the control of rising water tables by plantations.”⁷⁰
- Development of frameworks for incorporating proposals for additional interception activities under existing water access entitlements.

Addressing overallocation

Implementation of the interception requirements should also be considered within the context of broader NWI objectives. Paragraph 23.iv states that an objective is to “complete the return of all currently overallocated or overused systems to *environmentally-sustainable levels of extraction*.”⁷¹

Paragraphs 41 to 45 require Parties to determine in accordance with the relevant water plan, the precise pathway by which any of those systems found to be overallocated and/or overused as defined in the water planning process will be adjusted to address the overallocation or overuse, and meet the environmental and other public benefit outcomes.

Parties agree to address significant adjustment issues affecting water users, in accordance with paragraph 97. This paragraph says parties must consult with affected water users, communities and associated industry on possible appropriate responses in water availability as a result of implementing the reforms proposed in this Agreement including:

- Tradeoffs between higher relations and lower absolute amounts of water
- The fact that water users have benefited from using the resource in the past
- The scale of changes sought and the speed with which they are to be implemented
- The risk assignment framework in paras 46-51

Overallocated and stressed catchments are rarely a consequence of land-use changes which affect greater interception by tree crops and perennials. With the exception of some former grasslands in western Victoria, land-use change to tree crops and perennials has been to replace unnatural grasslands which were producing unnatural stream flows. These unnatural streamflows have been over allocated for consumptive uses. Irrespective of how the *environmentally-sustainable levels of extraction* might be calculated, it should be recognised that interception by tree crops is much closer to the environmental norm and not the root cause of the problem to be solved.

Assignment of risk

⁷⁰ Intergovernmental Agreement on a National Water Initiative, paragraph 57.i)b)

⁷¹ This is defined as the level of water extraction from a particular system which, if exceeded would compromise key environmental assets, or ecosystem functions and the productive base of the resource.



The NWI also aims to achieve “clarity around the assignment of risk arising from future challenges in the availability of water for the consumptive pool” (paragraph 23.vi).

Paragraphs 46 to 51 of the NWI require Parties to have in place a framework for assigning risks (between water users, state and Australian governments) the risks of changes in water availability due to climate change, periodic natural events (e.g. bushfire and drought) and policy change.

It does not explicitly recognise the impact on water availability due to patterns in land use change. However, it may provide guidance in terms the inclusion of land use change into a water management framework.

Guidance on implementation of the NWI

Two biennial assessments of progressing in implementing the NWI have been completed. The 2009 assessment⁷² found that most jurisdictions had been slow in identifying and addressing significant interception of surface and groundwater. It recommended that significant and potentially significant water interception activities be immediately identified and quantified, and a process for addressing them clarified.

This finding and recommendation followed a National Water Commission (NWC) position paper on Approaches to, and challenges of managing interception in 2008 and an occasional paper⁷³ on the same subject.

The position paper argues strongly that meeting interception requirements “will be difficult without rigorous quantification (measurement and modelling) of the major forms of water interception and the impact that they have on allocation of water – including environmental water – as part of the water planning process.”⁷⁴

It states that “different jurisdictions continue to assess ‘sustainable levels of extraction’ differently and having differing approaches to the definition of ‘overallocation’. Having a clear and agreed view of these concepts is fundamental to decisions about how to manage interception.”⁷⁵ It also reveals the major problem is related to overallocation.

It expresses concern about the lack of action and suggests the prioritisation of the interception activities noted in the NWI, handling interception in stressed catchments and improving measurement and modelling as a means to stimulate progress. Since this time, many jurisdictions have undertaken substantial technical work to identify and measure significant and potentially interception activities as a basis for a policy response.

⁷² National Water Commission (2009) Australian Water Reform 2009: Second biennial assessment of progress in implementation of the National Water Initiative, Chapter 1, http://www.nwc.gov.au/resources/documents/2009_BA_chapter_1_water_planning.pdf

⁷³ Duggan, K., Beavis, S., Connell, D., Hussey, K. And MacDonald, B. (2008) ‘Approaches to and challenges of managing interception: A review of current measurement and management practices for the determination of run-off interception and the implications for the implementation of the National Water Initiative’, Waterlines Occasional Paper No. 5, February, <http://www.nwc.gov.au/resources/documents/approaches-interception-body-waterlines-0208.pdf>

⁷⁴ National Water Commission (2008) Approaches to, and challenges of managing interception: National Water Commission position, http://www.nwc.gov.au/resources/documents/5_Approaches_to_and_Challenges_of_Interception_-_PS1.pdf, p.1

⁷⁵ Ibid.



Importantly, the NWC has recently developed a draft set of policy guidelines for water planning and management to begin to provide better clarification and guidance on such issues as interception.⁷⁶ The guidelines suggest that management responses to interception should:

- be commensurate with the level of risk posed by an activity to the integrity of water access entitlements or the achievement of environmental outcomes of the particular catchment or aquifer;
- recognise the potential social, economic and environmental implications of management actions;
- be as simple and efficient as possible whilst minimising transaction costs;
- be complementary with existing management activities undertaken within each jurisdiction; and
- avoid retrospective measures where possible.

The guidelines are yet to be finalised and will not be binding but further consideration of complex issues in developing policy to implement the NWI. They are unlikely to be inconsistent with the Victorian Government's commitments and policy principles for addressing the impact of land use change on water resources.

Securing Our Water Future Together, Victorian Government White Paper, Action 2.20

In 2004, the Victorian Government released a White Paper on water, which set out 110 actions to facilitate sustainable water management over the next 50 years.

Action 2.20 commits the Victorian Government to:

- undertake a statewide assessment to identify high, medium or low hydrologic impact zones for new plantation developments;
- develop appropriate tools, for example planning provisions, incentives and pricing systems, in consultation with stakeholders to account to the impact of new plantations on water resources, water salinity, greenhouse and other environmental benefits and costs of plantations; and
- apply existing planning arrangements until the new arrangements are in place.⁷⁷

It also states the project "will assess the impact of other significant land use changes on the water resource. The current mix of land uses will act as the baseline – so existing land uses will not be affected by the new planning arrangements."⁷⁸

Implementation of Action 2.20 rests with the Department of Primary of Industries (DPI). Action 2.20 is linked to implementation of the NWI, the Murray Darling Basin Plan and Victoria's Regional Sustainable Water Strategies.

In 2008, DPI undertook detailed modelling of the Corangamite and West Gippsland regions using the Victorian Government's catchment analysis tool (CAT) and commissioned Sinclair Knight Merz to use their SoilFlux model to estimate water use for a range of land use changes across the state. DSE has also undertaken substantial modelling work. The majority of this work remains internal.

⁷⁶ National Water Commission (2010) Consultation Draft – NWI Policy Guidelines for Water Planning and Management, Draft.

⁷⁷ State of Victoria (2004) op. cit., p. 35,

⁷⁸ Ibid.



DPI also commissioned Acil Tasman to undertake research and provide advice on the range of potential instruments and controls for managing the impact of land use change on water resources within the context of any environmental benefits that land use change can provide.

The determination of policy and policy implementation phases were not specified but were to be further defined and undertaken by DPI and DSE after the completion of the biophysical modelling and policy development project.

The Acil Tasman report has now been publicly released (April 2010) and the Timber Industry Strategy (TIS) has specified Victorian Government policy principles for implementing Action 2.20 along with changes to treatment of plantations under the Victorian planning arrangements.

Acil Tasman Review of Policy Options

The Acil Tasman report, *Land Use Change & Water Resources – Review of Policy Options*⁷⁹, identifies that:

- changing land use and management patterns have an impact on water availability (volume) and reliability (timing of flows);
- Rainwater before it enters streams and groundwater is not currently recognised in water accounts and currently there are conflicting rights to water use between the owner of land on which the rain falls and those using water downstream;
- Rights to ‘pump’ groundwater via deep-rooted vegetation are largely unregulated;
- Mechanisms should create incentives for water to be directed to where the use provides the greatest benefit through interception, extraction or environmental flows;
- Policy development must recognise high levels of uncertainty in assessing project impacts and the potentially high transaction costs;
- It is necessary to address conflicts across access rights to consider a package of policy options including monitoring, planning tools and market-based instruments. One option as an appropriate tool is the development of market instruments to allow trading amongst interceptions and between interceptions and other uses of the water – including trading with eco-markets.

It also found that notable impacts on water interception from land use change are currently limited to a number of small localities. The response of DPI is that “as such there is no compelling case for a state-wide regulatory framework at this time.”⁸⁰ This is pragmatic and appropriate. It also states “Over time however, increasing competition for water resources may create pressure for Government to actively and comprehensively manage water interception issues.”⁸¹

This response does not preclude the development of policy to address areas of stress as regionally appropriate. However, any regionally-based measures should be consistent with principles for sound policy.

The research and findings of the Acil Tasman report inform the detail of this submission.

In addition, the following policy principles were specified as a basis for sound policy and risk management:

⁷⁹ Acil Tasman (2010) op. cit.

⁸⁰ ‘Our Water Our Future Action 2.20 project’, Email update to stakeholders from Luke Wilson, Victorian Department of Primary Industries, 5 May 2010

⁸¹ Ibid.



- “Intervention needs to be seen as entailing benefits greater than the intervention costs and risks;
- Protection of options while better policy instruments are developed and information is gathered may justify interventions that would otherwise fail this cost effectiveness test – by recognising the value of the options retained;
- However, care is needed not to have interim policy settings actually intensifying perverse investment incentives;
- Higher cost interventions may be justified where the stakes – both risks of substantial damage and scale of possible opportunity – are high. Measures to better align the cost of the intervention with the scale of the stakes can be very effective;
- Risks of large ‘collateral damage’ can be best limited by targeting interventions at causes rather than symptoms;
- Unavoidable risks are generally best allocated to those best placed to manage the resultant damage;
- Rights, including access rights, should generally be assessed in terms of the option value, inclusive of options not yet exercised but possibly paid for, not just current use.”⁸²

A number of policy principles agreed by the Victorian Government to address land use and interception issues as a result of the Acil Tasman report, including that:

- Government action will only be taken where the benefits of action outweigh the costs, and where sudden, material change to asset values can be avoided;
- Government action will not discriminate between land uses in relation to water interception;
- Government action will be based on defensible evidence, address the causes of water interception and fully assess the impacts of intervention options;
- Where Government action is appropriate, a response will be flexible, adaptable, and tailored to suit local circumstances, within a consistent state-wide approach that ensures comparable responses to like circumstances;
- A response will drive efficiency and create incentives for landholders to provide innovative solutions for land and water management;
- Over time, effective management of water interception issues may include establishing tradeable water interception rights; and
- Ongoing investment in new science and research into policy design will ensure policy improvement.⁸³

Timber Industry Strategy

The 2009 Victorian Timber Industry Strategy (TIS) commits the Victorian Government to “implement agreed outcomes arising from Action 2.20 of Securing Our Water Future Together regarding the impact of land-use change, including timber plantations, on the water resource (quality and yield).”⁸⁴

“In order to manage the impact of land-use change on water resource, through Action 2.20 and the Western region and Gippsland region sustainable water strategies, the Victorian Government will ensure that the following principles are applied:

⁸² Acil Tasman (2010) op. cit., p. 51

⁸³ ‘Our Water Our Future Action 2.20 project’, Email update to stakeholders from Luke Wilson, Victorian Department of Primary Industries, 5 May 2010

⁸⁴ State of Victoria (2009) op. cit., p. 30



- the benefits of government action to manage the impacts of land-use change must outweigh the associated costs
- any technical findings must be based on sound and reputable evidence and science
- the impacts of plantation water use must be considered in conjunction with its benefits to the community
- any proposed policy or other regulatory response must take into account the need for equitable and consistent treatment of timber plantations with other agricultural land-uses.”⁸⁵

“The broader benefits and impacts of plantations will be taken into account when developing the management tools to reflect Victoria’s socio-economic and physical landscape.”⁸⁶

In addition, Action 4.1 of the TIS states that the Victorian Government “will continue to recognise timber plantations as an ‘as of right’ crop-raising activity in the farming and rural activity zones.”⁸⁷ It specifically commits the Victorian Government to streamline the planning approvals process for establishing timber plantations, so that, beyond compliance with the Code of Practice for Timber Production 2007, it is treated on an equitable basis with other agricultural land uses.

Draft Western Sustainable Water Strategy

The water White Paper also committed the Victorian Government to develop five regional Sustainable Water Strategies (Action 2.11) to plan for secure and affordable water supplies and healthy rivers and aquifers across the State. The strategies are required to set priorities and directions for:

- “managing changes in the demand for water from urban, irrigation and other consumptive and non-consumptive uses;
- Investment in water supply systems across water authority boundaries;
- Investment in major infrastructure for water recycling and re-use to utilise alternative water sources and replace potable water use;
- Stream Flow Management Plans for unregulated streams; and
- Groundwater Management Plans.”⁸⁸

The strategies could also enable the Government to vary or enhance the Environmental Water Reserve.

The strategies had initially referred to the statewide project on Action 2.20 as the process to set a policy approach for managing the impact of land use change on water resources. However, managing the impact of land use change has been included in the Western Region SWS for a number of reasons including:

- Pressure to respond to progress in South Australia on this issue, in particular due to a desire to achieve policy complementarity given shared groundwater resources and [the border zone management agreement];
- A lack of progress on Action 2.20 in developing a proposed policy response based on the hydrologic modelling and policy analysis;
- The plantation expansion in the Western Region and occurrence of other land use changes over the past decade in areas pressure on water resources and improved knowledge and increased political and community concern about that.

⁸⁵ Ibid., p. 30

⁸⁶ Ibid.

⁸⁷ Ibid., p. 25

⁸⁸ State of Victoria (2004) op. cit., p. 28



The Draft Western Region SWS sets out guiding principles for assessing options to secure the region's water future, including:

- Shared responsibility and shared benefit;
- Recognising existing rights and entitlements;
- Allowing individuals to manage their own risk and exercise their own choices;
- Being prepared without acting prematurely;
- Maximising efficiency and seeking multiple benefits;
- Maximising environmental outcomes; and
- Socially responsible decision making.⁸⁹

We believe that the guiding principles set out in the Draft Western Region SWS are broadly consistent with principles applicable to addressing land use change and water, which are set out in other National and Victorian agreements, commitments and policy documents.

However, there are some important nuances which require interpretation:

- In recognising shared responsibility and benefit, it is logical that whilst no group, generation or stakeholder should receive additional benefit, they should also not receive additional or undue discrimination. We recognise here a principle of equitable treatment across land uses and rights to water;
- In recognising existing rights and entitlements, assessments (and by logic response measures), will be appropriate to the magnitude of impact and the accuracy of the available information;
- Socially responsible decision making requires decisions about water sharing to be equitable and consider community values. We believe it is implicit (but needs to be made explicit) that they must also be based on sound science. This is supported by existing commitments by the Victorian Government.

In addition, sustainable development and regional growth appears to be missing. We recommend this is included as goal and guiding principle.

It is important for such high level principles to be reflected in the final Western Region SWS, and if developed and implemented appropriately, may better inform other jurisdictions in the equitable and sustainable water management of plantation forestry and other intercepting land uses.

Murray Darling Basin Plan

The Murray-Darling Basin Authority (MDBA) is developing a Basin Plan, as required by the CoAG Intergovernmental Agreement on Murray-Darling Basin Reform and 2008 Amendments to the Commonwealth Water Act 2007. The Plan will be a legally enforceable document that provides for the integrated management of water resources in the Basin and is scheduled to be completed by 2011. The Plan will cover sustainable diversion limits (SDLs) on the quantities of surface water and ground water that may be taken from the Basin water resources (including interception activities).

The water planning framework being developed by the Murray Darling Basin Authority (MDBA) for the Basin Plan and sustainable diversion limits (SDLs) for consumptive and environmental uses specifically recognises the importance of sound science and the broader economic and social context of land use regulation.

⁸⁹ State of Victoria (2010) op. cit., p. 20



In November 2009, the MDBA released an Issues Paper on the Development of Sustainable Diversion Limits for the Murray-Darling Basin.⁹⁰ The MDBA's Issues Paper suggests an approach based on the NWI but which does not draw on the approaches being developed in Victoria and South Australia in any detail.

It proposes that, the MDBA will use the best available knowledge to determine which interception activities could significantly impact on the Basin water resources either on an activity-by-activity basis or cumulatively and that thresholds of significance will be developed, e.g. area thresholds for plantations or volume thresholds for farm dams. Water resource plans would then need to establish suitable management approaches and specific kinds of interception activities may be required to hold a water access licence equivalent to the volume being intercepted.

The Issues Paper lacks detail and consideration of key issues which have been identified in developing policy responses in Victoria and South Australia, such as the difference between existing land uses and land use change. Ultimately, it is desirable to have a level of consistency in the treatment of interception in the Murray-Darling Basin and the States.

Reconciling policy principles

Based on the consideration of the National and Victorian agreements, commitments and policy documents, which set out policy principles and requirements for addressing the impact of land use change on water resources, we propose the following set of consolidated principles as a benchmark for considering the key issues and management options.

It is worth noting that the NWI, Action 2.20 and the TIS constitute requirements and commitments for the Victorian Government. We have also included the Guiding Principles in the Draft WR SWS and where applicable, we have noted the principles articulated in the Acil Tasman report.

Principle	Links	Victorian Government commitments
Equitable treatment of all land uses	Consideration of all land uses with a significant or potentially significant impact on water resources Equality in coverage of land uses, measurement of significance and management approach WR SWS Guiding Principles (Shared benefit and shared responsibility, socially responsible decision making) Acil Tasman DPI – Victorian Government	NWI Action 2.20 TIS 5.1
The impacts of interception from land use changes must be considered in junction with their benefits to the community	Impacts on water yield should be considered in conjunction with other impacts including socio-economic impacts, salinity, carbon and other environmental impacts. WR SWS Guiding Principles (shared benefit and shared responsibility; maximising environmental outcomes, maximising efficiency and seeking multiple benefits)	NWI Action 2.20 TIS 5.1 MDBA BP

⁹⁰ Murray Darling Basin Authority (2009). Issues Paper: Development of Sustainable Diversion Limits for the Murray-Darling Basin, November.



Principle	Links	Victorian Government commitments
	Acil Tasman and DPI – Victorian Government: Where action is appropriate, a response should be flexible, adaptable and tailored to local circumstance, within a consistent statewide approach that ensures comparable responses to like circumstances.	
Management of new or additional land use change		NWI Action 2.20
Technical decisions on management should be based on evidence and sound science	DPI – Victorian Government (science on the causes of interception and impacts of intervention)	NWI Action 2.20 TIS 5.1 MDBA BP
Benefits of intervention must outweigh the costs	WR SWS (being prepared without acting prematurely) Acil Tasman (manage risks of damage by targeting causes rather than symptoms) DPI – Victorian Government (and avoid sudden, material change to asset values)	TIS 5.1
Recognition of existing rights and entitlements	WR SWS (recognition of existing rights and entitlements) WR SWS Legally secure but varying reliability, assignment of risk & third party impacts will be defined and reduced or compensated. Also links to socially responsible decision making and maximising environmental outcomes. Acil Tasman – rights should be assessment in terms of option value rather than current use (including rights not yet exercised)	Victorian Government Water White Paper
Allow individuals to manage their own risk and exercise their choices	WR SWS (maximising efficiency) Acil Tasman DPI – Victorian Government	
Adaptive policy, which is supported by investment in new science and research	WR SWS Acil Tasman DPI – Victorian Government	



Appendix 2. Western Australian and South Australian Approaches to Plantations and Water Interception

Western Australian (WA) Policy Approach to Plantations and Water interception

Water Resource Management in WA

The principal WA Act under which water resources are managed is the *Rights in Water and Irrigation Act 1914*. It and another six Acts covering water resources management are seen by the WA government to be old, outdated, and heavily amended already. WA adopted the NWI on 6 April 2006 and the NWI principles have been adapted to WA conditions via processes such as the *Blueprint for Water Reform in Western Australia*, the government's response to the *Blueprint*, and the *2007 State Water Plan*.

WA views these reforms to have a requirement for reliable and effective water planning and secure water access entitlements. Reliable plans and entitlements are seen to be:

- Based on science;
- Matched to the available supply;
- Be ongoing or perpetual;
- Meet community needs; and
- Binding in law.

Further changes to the State's water legislation are seen to be needed by the WA government in order to make plans and water entitlements consistent with national and state reform proposals. This will require a new allocation system to be put in place in areas where water is fully used or currently overused.

Other reforms that will require changes to law include:

- Risk management;
- Environmental water management;
- Protection of water quality;
- Dealing with water interceptions (eg. plantations);
- Improvements in water trading;
- Water charges.

It is the WA government ambitious intent during the reform process to consolidate the seven existing Acts into a new piece of legislation that addresses all these issues.

Current status of water reform in WA

In particular regard to reforms dealing with water interceptions (eg. by plantations) the WA government held a number of stakeholder meetings during period November 2009 – February 2010. A '*Discussion Paper - Water Resources Management Options*' gave stakeholders insight into the Governments policy direction and the ability to raise any specific concerns. The Discussion Paper states:

- that plantations intercept water reducing the water flow in water courses and aquifers;
- interception of water is problematic only in areas with high levels of water use and high rainfall areas;
- as a result WAP or regulations may require users to obtain a water access entitlement or license for plantation forests; and



- in other areas of the State, plantations assist in salinity and land management and would not require regulation.

Industry stakeholders felt that plantations were dealt with, in the main, in a balanced and measured way. Key principles considered by the government and many promoted by industry stakeholders include:

- All existing plantations (at the time of legislation) will not need to be licensed, but may obtain a licence on application if they wish;
- Where new plantations have an environmental benefit (e.g. ameliorate salinity) they will not require a licence;
- Where water demand is high new plantations would have to compete for water on the same basis as all other users;
- Second and subsequent rotations would not be considered a change of land use, (i.e the original water licensing arrangement for the plantation would continue) but adjustment of area may be necessary if there have been reductions in the consumptive pool over the life of the previous rotation;
- Clarification of the methodology to be used in situations where the consumptive pool is reduced by decreasing rainfall to ensure that plantation water use is reduced proportionately with other users;
- Where competition/demand for water is low, new plantations will not need a licence; and
- Advisory boards to be restructured to represent the wider range of stakeholders.

The next steps are understood to be:

- Approval of the draft by Cabinet early 2010
- Release of the Green Bill for consultation. Late 2010
- Introduction into Parliament. Spring 2011

WA policy approach

The current state of WA policy arrangements are seen by the plantation industry as generally positive, considered and a more measured approach in applying the NWI 'land use change' and 'water interception' principles to state and regional water policy frameworks in WA.

South Australian (SA) Policy Approach to Plantations and Water interception

SA state-wide policy framework

In June 2009 the Government of SA released a state-wide policy framework for the managing the water resource impacts of plantation forests partly in response to responsibilities under the Intergovernmental Agreement on a National Water Initiative (NWI) which requires significant water intercepting activities to be accounted for and managed (*'Managing the Water Resource Impacts of Plantation Forests', State-wide Policy Framework, South Australian Government, June 2009*).

The policy framework sets high-level principles and attempts to provide guidance to state government agencies and regional natural resource management (NRM) boards to:

- Ensure that water-affecting activities are identified and managed within sustainable limits;
- Promote the use of appropriate management tools; and
- Effectively account for the environmental, social and economic impacts of water allocation decisions.



The framework provides direction for the development of state and regional NRM plans, including water allocation plans. It also recognises that plantation forests are a dry-land crop and use water differently to irrigated agriculture and other water uses.

The framework describes 12 policy principles:

- Sustainable management of water resources;
- Optimise net benefits to the community;
- Sustainable industry development;
- Consistent and transparent treatment of water users;
- Use markets and trading;
- Best practice regulatory approach;
- Science-informed policy and planning;
- Adaptive and precautionary approaches to managing water resources;
- Clear open communication and participatory management;
- Accounting for regional settings;
- Recognition of State, national and International directions and obligations;
- Consistent terminology.

The framework details a number of potential options for managing water resources:

- *A water license under the Natural Resources Management Act 2004 (NRM Act).* The licensing system manages water resources by allocating specific volumes to licensed users of a prescribed water resource;
- *A water-affecting activity permit under the NRM Act.* The permit system manages water-affecting activities by controlling their extent and nature;
- *Codes of practice and industry agreements.*

Many of these principles and approaches have been supported and espoused by the plantation industry however it should be noted that this is a guidance document and not a template, it is therefore the relevant agencies and/or NRM Board's implementation of these guidance principles in regional WAP's and other policy documents that is the key process and potentially of key concern to the plantation industry.

South East SA water resources and forestry

SA has a legislative framework through the *Natural Resources Management Act 2004* for providing water resources management measures. These include:

- Prescription of a water resource;
- Restrictions on water use;
- Development and implementation of regional NRM plans;
- Development and implementation of water allocation plans for all prescribed water resources in the State;
- Extensive community consultation during the preparation of all water plans.

In 2004, a regulation was passed by the Minister for Environment and Conservation prescribing plantation forestry as a 'water affecting activity' requiring a permit under the *Natural Resources Management Act 2004*. SA has set a threshold for plantation forestry in the South-East of the state and has made provision for water licences and permits to be granted over this threshold. Provision was made to allow plantation forestry expansion in defined areas up to a threshold of an additional 59,000 hectares without the need to obtain a water allocation.



New plantation water use has been accounted for in water management areas either within the threshold limits or by offsetting existing water allocations. Where the threshold expansion limit has been reached in a particular management area, new forestry plantations must secure an existing water allocation to offset the water impacts of the new developments. Water allocation for plantation forestry will be managed through water allocation plans (WAP).

SE NRM Plan

On the 1 December 2009 a draft SE Regional NRM Plan was released for general stakeholder comment. It included specific details related to forestry and water. As per section 76 of the *Natural Resources Management Act 2004*, a water allocation plan (i.e. the Lower Limestone Coast WAP) will also be developed and will form part of the board's regional NRM plan. The draft SE Regional NRM Plan deferred a lot of the detailed water management policy implementation to be developed in the relevant WAP.

Comments on the draft NRM were sought in February 2010 and many forestry stakeholders submitted detailed comment, reiterating the common key principles such as significance, equity, no retrospectivity, science –based, broader cost/benefit analysis, history of water use and land-use, and the positive environmental benefits or afforestation to name a few.

Draft Lower Limestone Coast (South East) Water Allocation Plan (WAP)

In 2006 the SE NRM Board presented a draft Lower Limestone Coast (South East) WAP which attempted to account for and manage plantation forest impacts on groundwater. The Facilitated Forestry Stakeholder Process, which involved stakeholders, the Board and the Department of Water, Land and Biodiversity was held from May to December 2006. In December 2007 an additional non-statutory, additional consultation phase was undertaken by the SE NRM Board prior to further progression of the draft WAP.

The draft WAP proposes:

- All plantations that are located in areas with shallow groundwater (<6m) must have water entitlements.
- Existing second rotation plantations will be granted a permanent water entitlement.
- First rotation plantations will receive temporary allocations. This applies mainly to blue gum plantations and allows water entitlements to go back to the consumptive pool for reallocation to other users if the plantation development does not continue into a second rotation.
- All future plantations will require a water allocation. Water can be accessed on the water market or through allocating unused forestry threshold (if available).

The SE NRM Board has continued to develop the draft Water Allocation Plan in response to written submissions and vocal representation from concerned plantation industry stakeholders. The current draft arrangements in South Australia seem to have progressed further than any other similar process, have pre-empted adequate scientific research, discriminate against plantations rather than addressing all land use change, and apply retrospectively to existing plantations.

The ability to potentially license forestry through a water allocation plan was seen to be dependent on legislative changes to the *Natural Resources Management Act 2004*.

The next step is further statutory consultation on the draft Lower Limestone Coast Water Allocation Plan awaits the finalisation of legislative changes under the *Natural Resources Management (Commercial Forests) Amendment Bill 2009*.



Natural Resources Management (Commercial Forests) Amendment Bill 2009

In June 2009 the SA Government introduced the Natural Resources Management (Commercial Forests) Amendment Bill 2009. Due to stakeholder concern the Parliament before the SA election in March 2010 referred the *Natural Resources Management (Commercial Forests) Amendment Bill 2009* to the Natural Resources Committee for inquiry and there was no further progress prior to the SA election. The Labour government has been returned to Government and key responsible Ministers include the new forestry minister Michael O'Brien and the new minister for water Paul Caica (will be the focus regarding water regulation and policy in SA). It is assumed that the inquiry, additional stakeholder input, and further work on the Bill should now be progressed.

Forest Industry comments on the SA policy approach

The forest industry sees the myriad of policy processes and approaches currently in development in SA regarding water and plantation interception have pre-empted adequate scientific research, discriminate against plantations rather than addressing all land use change and apply retrospectively to existing plantations.

Some of the key principles and issues identified by the plantation industry (particularly in regard to the *Natural Resources Management (Commercial Forests) Amendment Bill 2009*) include but are not limited to:

- *Continued policy framework uncertainty, political and regulatory risk* is affecting operating and investment confidence in all sectors of the plantation industry;
- *Equitable treatment of the forest industry vis à vis other water users.* The proposed system is unique to forestry, contrary to the 'land use change' basis of the NWI, other water interceptors are not addressed;
- *The consequences of retrospectivity.* Again under the NWI any consideration or potential policy change was for 'land-use change'. That is any application of proposed policy to existing forests has adverse consequences and is a significant change. Thought must be given in the Bill to risk sharing due to adverse impacts from policy change, structural adjustment, disputes resolution and clarification of the impacted entity. History of use and History of reliance principles should be incorporated into policy. In addition subsequent rotations of existing commercial plantations are not seen as a 'land use change' or a trigger to enact a policy setting.
- *NRM Board powers.* There is concern about the broad and arbitrary powers that vest into NRM Boards especially in regard to this water interception issue that are more appropriately the province of State Governments;
- *More investigation and analysis of environmental, social and economic cost/benefit analysis* should be incorporated into the policy implementation process;
- *The methodology of determining the 'significance' of an interception activity should be clarified and refined.* In addition it should equitably address other land-use impacts on water policy and planning across the broader vegetated landscape.

Partially in response to these issues, the South Australian government established in February 2010 a small taskforce of key Government agencies and members of the South East NRM Board to undertake a technical review of the hydrological science of interception activities and a cost-benefit analysis of different policy scenarios. It will be important for this process to address many of the outstanding issues with the draft Lower Limestone Coast Water Allocation Plan and provide opportunities for adequate consultation and input from the forest industry as a key stakeholder.

Potential SA 'policy slop' into other jurisdictions



The SA policy arrangements are seen by the forestry industry as a negative and inequitable policy approach and to set a potentially damaging policy framework precedent for Victoria SWS processes and other State's processes around Australia.

The desire for a certain amount of consistency between policy frameworks and implementation especially between regions and catchments located on adjacent State borders is understood. However the forestry industry sees that an efficient policy framework can be complimentary, it does not however have to be the same or similar, especially in light of the many different regional differences between the different jurisdictions, that is *'one size does not fit all in this debate'*.

