Horticulture and farming groups

Public submissions to Securing Western Australia’s water future: Position paper
Policy submissions - Water Reform  
Policy and Innovation Directorate  
Department of Water  
PO Box K822  
Perth WA 6842

Dear Madam/Sir,

Find attached the policy submission of the Preston Water Users Group. To make sure the deadline is met, I have sent the submission via email to policy@water.wa.gov.au as well.

The group can be contacted, apart from the above postal address, via email: PrestonWUG@skymesh.com.au.

Regards

Harry Ortheil  
Secretary
Policy Submission - Water Reform - Preston Water Users Group

The Preston Water Users Group (the group) consists of local farmers, irrigators and other water users such as aquaculture operations, which use water within the Preston River catchment area.

As per the request from the Department of Water (WA), the group has discussed the position paper 'Securing Western Australia's water future'. This submission reflects the major discussion points and concerns raised by the group in response to the position paper.

While the group realises that a position paper is a precursor to policy and therefore does not contain details, it is disappointed a draft of the resulting legislation will likely not be available for public comment before being tabled and considered in parliament. The group has concerns that critical specific details are not contained in the position paper which would be included in the resulting legislation, and that it was only able to discuss the general motherhood statements which were outlined in the position paper rather than specific legislative details.

The group nevertheless appreciates the limited information available in relation to the proposed laws at this point in time, as well as the opportunity to make a submission for consideration.

The main issues which the group would like to raise in its submission are:

- Issues relating to building private water storage on farms;
- The treatment of plantations in the resulting legislation;
- Metering of farm dams; and
- Issues relating to spring fed water sources and catchment from non-declared watercourses and future certainty for farmers in making investment decisions.

Building private water storage (dams) should be encouraged and supported in the SW

The group unanimously agreed that on-farm storage facilities of water collected through the winter months plays an extremely important role in the South West, well beyond their use as irrigation reservoirs. Privately built farm dams provide vital habitat for native wildlife and critical water storage for fire fighting, the value of which should not be underestimated.

The construction of private dams on farms involves private capital being expended which provides the community and environment with a vital resource, which would otherwise require funding by the State Government from consolidated revenue to meet community expectations relating to environmental outcomes and bushfire preparedness.
Furthermore, the group is of the view that farms should be drought proofed as much as possible by building storage dams wherever possible, considering a drying climate and inconsistent rainfall volumes from year to year. The construction of farm dams is critical to ensuring the ongoing, consistent and significant contribution to the WA economy from the agricultural sector in the South West of Western Australia.

As such, the group is of the view that government should encourage more dam construction by private parties, considering the various environmental and community benefits they provide.

Private dam builders should be provided with incentives to expend their private capital to build such vital infrastructure rather than being discouraged from doing so via onerous fee and application processes.

**Plantations are unlicensed high-volume users**

Plantations constitute the largest water users in many catchments in the South-West, including the Preston River Catchment. Plantations are exporters of water from a dry continent, as the amount of water consumed to grow non-native species such as pines and blue gums is materially significant.

The group considers it disturbing that the position paper only proposes to consider plantations at a later stage in time, possibly never. The group questions if more research is really needed, as the amount of water to grow a tree is has been long established by research, and the impact of plantations on reservoirs downstream has been clearly documented in many instances.

The group further suspects that the claim of more research being required seems to be a euphemism for not daring to ask the plantation industry to play its part in water management. As there is considerable research available highlighting the enormous water use of plantations (see for example 'Plantations and Water Use, Parsons et al, 2007, Australian Government, Bureau of Rural Sciences’ and numerous publications by CSIRO), the claim that plantations should not be included in legislative considerations at this point in time is entirely unacceptable to the group.

The group has concluded that a comprehensive water management strategy cannot be credible if the largest water users in many catchments are ignored by legislation, and the group is of the view that any attempt by government to introduce such inequitable legislation would considerably diminish acceptance of the legislation.

**Metering (of Farm Dams)**

The group noted that metering of farm dams may be planned and considers the metering of farm dams an unacceptable burden on farmers, as well as being unenforceable in practice.

Considering that a farmer may use water from their private reservoir for irrigation, household drinking water, stock water, provision of fire fighting water as well as hygiene purposes, it is clear that under any proposed metering scheme these water
uses would attract varying rates. Clearly it is impractical and cost prohibitive to have separate pumps for various purposes.

The position paper mentions alternative methods of measurement. These alternative measurements have to take into account the different uses. Dam capacity cannot be equally allocated, as storage for drought proofing, fire fighting, aquaculture and the like do not actually 'use' water. There is only evaporation loss which is replenished during winter.

Furthermore, the group questions just how the Department of Water proposes to monitor and read water meters on farms, and how it would propose to ensure compliance with such a scheme. It would be reasonable to expect that some farmers would object to having to pay for their water, and would thus circumvent any metering arrangements, in manner which would be untraceable and easy to achieve, simply by diverting water pumping past any metering facility.

As such the group believes the idea of metering farm dams to be unworkable, inequitable and poor public policy.

Properties not requiring licence (deemed spring fed)

The group understood one of the main objectives of the proposed licensing system to be long-term security (40 years) for any licence holder.

As per the groups current understanding, a licence grants a particular share of the consumptive pool and that once the consumptive pool is allocated no more water access rights are available for that pool. In addition it is understood that current proposals would result in Licences being granted on a first comes – first serves basis.

If this understanding is correct, it creates a problem for properties where the surface water is deemed spring fed (RIIWA 1914, section 5c). Currently a licence is not required (and cannot be granted) for such properties.

The group is concerned that such a property holder could invest in ventures using the water available on his property under current arrangements which do not require a license, however, it is conceivable that at a future date, a licence will be required for properties currently subject to RIIWA 1914, 5c. If at such time the consumptive pool for the catchment is fully allocated, the property holder in question could find themselves without water access rights on which ventures and investments were based on.

A situation where spring fed/surface water in the future does require a licence is quite possible (and maybe, from a water management point of view, even desirable) thereby negating the intended long term security outcomes of the proposed legislation for such landowners.

It is the groups understanding that in the South-West, currently approx. 10% of potential licences fall into that category (as estimated by SW Manager of Licensing). The group believes that one way to avoid such a highly inequitable and unintended outcome, is to exclude all water from properties subject to RIIWA 1914, 5c from the
consumptive pool and thus have it available to be granted to the property holder in case of an otherwise fully allocated consumptive pool.

**Conclusion**

The Preston Water Users Group welcomes the State Government's ambition to consolidate various confusing water legislations, and to provide water users with long term investment and operational certainty.

The group looks forward to further consultation and engagement by the State Government in relation to this legislation before it is enacted, to ensure it is equitable, enforceable, comprehensively inclusive and in the public interest.

For the Preston Water Users Group:

Donnybrook, 27 December 2013

Bert Russell  
Chairman

Harry Ortheil  
Secretary
4 November 2013

Dear Sir/Madam,

The South West Capes Water Users Group Incorporated represents commercial water user members in the South West Capes Water Region in Western Australia. We represent both licensed and non-licensed commercial users of water in our region and have a Memorandum of Understanding with the Department of Water.

We recently received a copy of the “Securing Western Australia’s Water Future – position paper – reforming water resource management”.

We would like to register our comments and submission for consideration with implementation of the proposed reform:

Licensing and water allocation for Spring Fed dams

We need to extend the management of water resources to include licensing of springs where they rise on a property and that water is used for commercial purpose. All of the water in Western Australia used for commercial purpose should be subject to management under new legislation.
All existing registered commercial use of water from both existing licensed and unlicensed dams/water resources should be recognized equally, as at present there is inadequacy under the RIWI act that has caused unlicensed commercial users of water to perceivably be disadvantaged in their future water requirements.

Basic rights should still allow people to take water from any managed resource that is on their land for stock, domestic, firefighting and household garden irrigation.

**Licensing and allocation for commercial water use for the purpose of visual amenity**
Many restaurants and accommodation facilities have water featured as a commercial attraction and visual amenity. As such, this forms an important part of that commercial operation. This type of commercial use of water should be recognized in new legislation.

**Licensing and allocation for forestry plantation**
We believe all water resources that are used for commercial application (other than normal riparian rights) should be subject to management and therefore licensed and issued a Water Allocation Entitlement. In the first instance, all unlicensed commercial water users in proclaimed areas should be licensed. This would include plantation timber as a commercial user of water (a clear definition of what constitutes a plantation should be provided to enable differentiation between commercial forestry operations and non-commercial farm shelter belts etc.).

**Water connectivity issues**
A major deficiency is the lack of clear and concise legal definitions regarding water resource language definitions.

Under current legislation the terminology used for describing “spring fed” dams, surface water catchment, “streams” and “ground water” has a failure to deal with any connectivity between groundwater and surface water. This is particularly so in localized catchments whereby water permeates into the soil and moves along shallow clay interface to enter dams.
Offshore ownership of Western Australian water resources There appears to be a legal omission in the new legislation for the protection (in the future) of our total unused water supplies and the potential of offshore ownership. It is common place to have offshore ownership of land in Western Australia. Has the DOW considered the future position of the management of the State’s water resource to foreign ownership? Have any ‘future’ policy provisions been established to deal with foreign controls of water resources, such as the Ord or Yarragadee? We would like to see that there is a review on the potential for offshore ownership and the subsequent risk and consequence of such ownership (e.g. shipping of water offshore). If we are in a drying environment and water is a precious resource, then the resource should be guarded for Australia’s future.

Local representation within the planning and consultation for water reform
The Southwest Capes Water Users Group Inc. has been established to provide an advocacy role between commercial water users within the Margaret River wine region geographical indicator (The Margaret River Wine Region GI) and government. We represent both licensed and unlicensed commercial water users.

We are concerned that our organization has not been recognized within this chapter of reform, with our Water Minister missing the opportunity of having representation from our group and the wine industry, within the stakeholder representative team reviewing the proposed legislation.

Thank you for this opportunity to register our comments. If you require future consultation please contact the undersigned.

Yours sincerely,

Colin Bell
Chairperson
Southwest Capes Water Users Group Incorporated (SCWUGI)
Warren Donnelly Water Advisory Committee submission to Water Reform position paper

The Warren Donnelly Water Advisory Committee submits the following comments on the proposed reforms to legislation governing water in Western Australia. The WDWAC has previously requested information on many of these points to the Department of Water but have not had a response. We therefore respectfully resubmit our questions and comments.

1. A number of committee members attended the forum in Pemberton on 1 November 2013. The focus and direction presented for water reform was the benefits and improvements to legislation not currently offered. These benefits were heavily promoted, however there was little explanation as to the detail of the proposals and the applicability of the benefits to our region and businesses.

With this in mind, the WDWAC requests that the Minister for Water and the Department of Water issue a Green Bill, to allow for further assessment of the detail of the proposed water reform. Without any indication of what is actually being proposed, it is difficult to make a properly considered submission.

2. The benefits strongly promoted by Mr Bagdon at the meeting in Pemberton included the increased security to our water entitlements offered by the new legislation, inferring our current licences lack security. This position is confirmed by the position paper, where it states the primary reform objectives are to enhance confidence in investment decisions by water users through increased security of access ...

While as business operators we welcome any increased security to any aspect of our businesses, we would appreciate any information on the local benefits that will arise out of the water reform package. As there was very little detail provided at the forum or in the position paper as to how our businesses or water entitlements will be changed, it is concerning to us as water entitlement holders that the primary reason for new legislation is increased security, without an indication of where or how our current licences may lack security.

As mentioned above, as a committee we have previously requested information from the Department of Water regarding how our current licences will be impacted, and why the department considers them "insecure". As committee representatives reporting back to local growers, we are concerned at the perception that has been generated in the community by the Pemberton meeting regarding the lack of security of the current system. We would like to be in a position to better explain any benefits associated with the proposed water reform, and how it may affect user's current water entitlements.

Therefore as committee members and business operators totally dependent on a secure water entitlement, we would like to know:

- What will be the improvements to our current entitlements and processes in a self-supply system?
- What is insecure about our current entitlements? and
- If the reforms do not pass, where does that leave our current entitlements and security for the continuity of our businesses and region into the future?

3. The position paper did not define what is a consumptive pool in terms of the Western Australian context, or indicate how a consumptive pool might apply in a self-supply surface water system. At the meeting in Pemberton, the Department of Water confirmed they regarded 'consumptive pools' as applicable to catchments where water is held in private farm dams. Members would like more information on how consumptive pools/water access entitlement regime would be relevant and advantageous, and feasibly operate for a self-supply surface water system. What would be the cost and benefits of such a regime for self-supply surface water with currently a very high reliability of supply?
4. In the absence of any information on how consumptive pools may operate, there is significant disquiet amongst local operators in the Warren Donnelly believing that they will be subject to conditions regarding when and how they can take their entitlement, and may be required to share any water they have. This is entirely inconsistent with the principles in the Warren Donnelly Surface Water allocation plan that ensures users have a high reliability of supply in any given year. The Water Allocation Plan has only recently been released, and now has good acceptance and understanding within the region. How will consumptive pools affect/be different from/be an improvement on, the principles contained in the Water Allocation Plan?

5. The position paper does not outline the possible disadvantages of the proposed reforms. For example, will the existence of a statutory management plan or statutory allocation limit impact the department's and committee's ability to quickly respond to an emerging water resource management issue because of the administrative processes involved in changing a statutory instrument? What protection would a statutory water allocation plan that does not have such flexibility offer to a downstream user? What protection do we have from a future government requiring any region to develop a statutory plan, even if we do not consider one to be in our best interests?

6. The position paper does not detail whether the current exclusion of spring dams from regulatory control should be retained into the new regime. Most members consider that the springs are an important part of the overall water balance, and permitting the uncontrolled growth in springs may impact the security of water for licensed users and the environment, particularly in a drying climate.

7. Members would find it useful if the position paper included a table that set out the key reform items for NWI, 2009 Blueprint and the 2013 proposals to enable easier comparison of the reform bundles.

8. Members support the proposal to retain non-statutory advisory bodies as a mechanism of engaging community and industry in water resource management. Members consider that non-statutory bodies play a vital advisory role, but would be unwilling to take on legislative or statutory responsibilities. It was felt that the makeup of such bodies would not necessarily reflect the average grower's interests. The Department of Water has the capacity under the current provisions under section 26GK of the Rights in Water and Irrigation Act 1914, however these have not been implemented- are the new provisions different from s26GK and why have the provisions of this section not been implemented? The WDWAC wishes to retain its current standing as a Ministerially appointed advisory committee and does not see any benefits of an overseeing statutory committee in the Warren Donnelly region.

Thank you for the opportunity to make a submission. We understand that this is 'enabling' legislation, however we do not believe that we can support it without further detail on the purported improvements. As it stands, the lack of clarity is promoting misgivings about the proposed legislation in our community.

Mr John Omodei
Mr Bevan Eatts
Mr Harvey Giblett
Mr Travis Luzny
Ms Diane Fry
Mr William Rice
Mr Bob Pessotto
Mr Paul Owens
The WA Turf Industry’s
COMMENT AND FEEDBACK

Securing Western Australia’s Water Future
Department of Water Position paper – Reforming Water Resource Management (September 2013)

December 2013
Following a review of the Department of Water Position paper – Reforming water resource management (September 2013), the WA Turf Industry is primarily concerned with regard to the suggested legislated and statutory changes to water allocation volumetric amounts to current license holders.

The WA Turf Industry expresses the particular disappointment that Turf and Landscape amenity horticultural industries are being represented by proxy on the stakeholder’s steering committee responsible for refining the position policies within the “Securing Western Australia’s water future” position paper. There has been no communication from these members with our industries in the lead up to, or since release of this position paper. Aside from WALGA representing Local Government Authorities Parks and Gardens management, there is no real representation of the turf or amenity horticultural industries on the stakeholder’s steering committee. An observation has been made that that whilst the current majority of stakeholders on the steering committee are ideally positioned to consult upon securing the broad economic and future infrastructure needs of the WA water resource such as how and where water licenses are managed throughout the state, they are not sufficiently competent to consult on actual allocation volumes to all sectors. The construction, mining and agricultural industries, each possess direct economic values in relation to their water usage, hence their vested representation on the committee.

However the ‘value’ of the turf and amenity horticultural industry is largely taken for granted and as such appears to be continually undervalued by the Department of Water and the other sectors mentioned. The ‘value’ of the turf and amenity horticulture industry cannot be quantified in the same terms as the construction, mining and agricultural industries. Moreover the security of the turf and amenity horticulture industry within the urban environment should be considered as ‘priceless’. The potential loss of quality public or private green space remains a very serious threat to the sustained health of the modern cultured environment.

“I had to live in the desert before I could understand the full value of grass in a green ditch”. Ella Maillart.

A number of experienced industry members are astounded that a number of stakeholders on this steering committee do not, nor ever will, hold a water license to extract water under allocation, yet their voice is heard significantly louder than that of those who grow, sustain and maintain amenity horticulture for Public Open Space, Sport and Recreation and domestic use in WA, (an area of significant water allocation particularly within the metropolitan area).

For this steering committee to be comprehensive, we believe that the following could/should have been invited on to the table;

- The Department of Sport and Recreation WA
- A representative for the wider turf and amenity horticultural industry, which includes the Sports Turf Association (WA), (with 200 members across Local Government, State Government, RTO’s and Private Schools etc), Parks and Leisure Association WA, Turf Growers Association WA, Lawn Mowing Contractors WA, Racing And Gaming Industry, Golf Course Superintendents Association WA, Commercial Mowing Contractors, Landscape Design and Architects Industry Associations WA and Nursery and Garden Industry Association WA.
- The Department of Environment and Conservation, which incorporates parks and wildlife.

Whilst the WA Turf industry totally supports the allocation of water for food production security, we are concerned that this paper places little social and recreational value on water for all.
Review of: Department of Water Position paper – Reforming water resource management (September 2013)

“Water is such a fundamental part of lives and is interwoven into the fabric of our societies.”

“Whilst a scientific approach to water management has many advantages, decision making needs to take account of social, economical, ethical and aesthetic values.”

“Water is an underpinning value of a successful and healthy community. Similarly, the same can be argued for the accessibility of high quality public open space in maintaining a community’s quality of life and uphold its wellbeing”

“When assessing water allocations for long term water security, the social and cultural impacts of such assessment should include;

1. The Social impact study of effects of changing water availability
2. The use a participatory modelling tool conjunctively with multi-criteria analysis to identify community values relevant to the prioritisation of environmental assets in the context of water scarcity.
3. Indigenous cultural values associated with water.

Results of trials demonstrate that identifying public and social values in water require a number of interactive and deliberative tools in order to engage the broad community in water planning. Of the three tools, the most innovative was the second tool as it facilitated deliberation about the relative importance of the environment and helped shift individuals from entrenched interest based positions to consensus on values in wetlands.

Research investigated values which feed into water planning decisions.
► Findings on the socio-economic impacts of change in water availability indicate resilience.
► Deliberative and visual methods identify societal values for environmental assets.
► Tools evaluated highly for generating dialogue and information exchange.
► Method for identifying preliminary Indigenous cultural water values.”

“Apart from a few minor chemical processes, water is neither created nor destroyed, it only moves from place to place and changes in quality. The total amount of water on Earth is 1.4 billion cubic kilometres (km3), but only around 41,000 km3 circulates through the hydrological cycle, the remaining being stored for long periods in the oceans, ice caps and aquifers.”

REVIEW SUMMARY

The WA Turf Industry’s review of the Department of Water’s Position Paper on Water Reform in Western Australia has resulted in the following comments:

- That the process be completely transparent with full regard for the social impacts and implications that the paper may have.
- There should be no uncertainty at all. The message to the community from all levels of government needs to be one which is united, comprehensible and sets a clear direction in water resource management, not one which is changing and therefore uncertain
- The Department of Water needs to maintain an ongoing collaborative approach with the Turf Production and maintenance industries and Amenity Horticultural production and maintenance industries, (and indeed all agricultural production industries), as vital members within local advisory groups, and not just those industries that make up the current steering committee
- The Department of Water, other state government departments, such as the Department of Sport and Recreation, the Department of Environment and Conservation, the Water
Corporation and local government also need to maintain an ongoing collaborative approach to remain connected to community.

- The Department of Water supports fairness and equity with water licensing rights.
- The Department of Water supports water sharing of available water resource for horticultural and agricultural pursuit
- That the Department of Water ensure that trading of water allocations benefits the community and not just those who place “highest value” on water.
- That the Department of Water supports best environmental practice for water extraction, monitoring and management.
- That secure water unamendable water allocation for food production remains of highest priority
- That Public Open Space (POS) should be recognised through the water entitlement and allocation process as providing high end community benefit.
- Those managers’ of Public Open Space, inclusive of local government and state government entities, are responsible for the development and ongoing maintenance of public open space, are recognised as private water users who have a duty to their constituency/community to sustain and maintain POS for community benefit.
- “The aesthetics of natural and green landscapes is known to have a significant impact on the mental health of people since plants and aesthetically pleasant landscapes are known to create a more relaxing, inviting setting for restoration and recovery (Browne 1992). It is well known that humans and their culture are parts of the natural world, and that the health of humans is inextricably linked to the condition of the environment (Jackson 2003). Natural open spaces and well-designed green spaces are known to provide opportunities for recreation, social interaction, and community activity (Gordon and Grant 1997; MacArthur 2002; Steptoe and Butler 1996; Ulrich and Parsons 1992). Therefore, with the aim of improving the health and well-being of citizens through facilitation of these activities, as well as stress recovery and physical activity, contemporary urban planners are increasingly challenged to create improvements to public spaces” (Hansmann et al. 2007).
- The existence of widely available, accessible and high quality public open space supports the health and wellbeing of communities and also provides employment opportunities to communities, upholding their livelihoods
- Without a doubt, proposition of amendable allocations instils uncertainty and insecurity rather than certainty and confidence in water allocations
- Irrigated green space, inclusive of public open space, is not capable of responding quickly and favourably to a sudden change in irrigation regimes or water volume delivery (especially considering the evapo-transpiration rates that occur in our climate)
- To adequately adapt to amendable licences, communities, local governments and public open space providers will require time and capital resources to implement alternative treatments and management options to green open space. If there are not the allocations required to maintain public open space at the required level to fully service community, how does the Department of Water and government propose that this important amenity be maintained? Natural green space is imperative for well being.
- The reduction of natural green open space in quality or availability would not be considered favourably by community nor is it consistent with the Department’s stated commitment to community wellbeing and livelihoods. This is a contradiction in terms
Allocations of water for agricultural and horticultural production and maintenance, inclusive of public open space, should not be amendable within the term of the licence unless there is an absolute crisis.

Benchmarks to drive efficiencies should adequately and realistically reflect the function of the water use and not be on a kilolitre per hectare basis. Benchmarks should incorporate other measures of efficiency (i.e. irrigation regimes, system efficiency, the use of soil moisture monitors/sensors and rain sensors).

Water for community health and well being, should be addressed in Statutory Water Plans.

The WA turf industry urges the State government and its departments to fund infrastructure for new environmentally friendly water sources and opportunities as a high priority.

“Climate change impacts on infrastructure will have a direct financial and reputational impact to corporations and government especially where public/private partnerships hand back a degraded asset to the state due to unexpected degradation and reduced life of an asset from changed climatic conditions. Essentially each form of infrastructure (water, power, transport, buildings and communications) has key sensitivities to a change in particular climate variables such as extreme wind, solar radiation, extreme rainfall, heat waves, and soil moisture. The direct exposure to climate change will of course depend on where they are located, the integrity/age of existing assets, the location of assets, and the expected service life of assets and the dependence of assets on other supply services that may also be vulnerable such as water, power and access. New investment for infrastructure will need to be ‘climate ready’ to meet future climate change design compliance. Organisations that are infrastructure intensive need to understand their existing direct exposure. Infrastructure that is being designed and built now is being designed on past climate, rather than the climate that infrastructure will experience during its expected life. Planning on the basis of a false assumption in this way presents a significant risk to governments, institutional investors, infrastructure sectors and individual organisations. Adapting infrastructure to climate change impacts”.

Michael Nolan
Maunsell AECOM

COMMENT AND FEEDBACK

The WA Turf Industry recognises, with the utmost importance, the value of water resources, its provision for current and future generations and the need to implement better water management practices sooner rather than later to allow communities to respond and adapt adequately to the pressures of climate change.

Turf producers and the turf maintenance sector accesses and utilises groundwater as per a Licence to Take Water (Groundwater) as “private” water users. Turf producers provide natural living turf, to municipalities, schools, private and commercial enterprise for public open space, sport and recreation and the domestic market. By and large, the end product is irrigated and maintained by the turf maintenance sector as green public open space and recreational facility and green infrastructure to a standard which enhances and upholds the community’s wellbeing. That is, the social, mental and physical well being of community.

Green open spaces provide the community with varying services and functions and are a direct benefit to a community’s health and wellbeing. A correlation can be drawn between the health of a community and the availability and quality of public open space. It has already been clearly defined by the Department of Sport and Recreation WA that in the Perth metropolitan area;

• The new suburbs in the outer metropolitan area already have a shortage of active playing fields.
• Whilst currently adequately supplied, 47% growth in the inner and middle suburbs will result in an under supply.
By 2031 across Perth and Peel, the total shortfall of open space required for sport (and supporting infrastructure) is estimated at approximately 495ha.

Without having the opportunity to review the proposed legislation, the WA Turf industry can only comment on what has been proposed through the Department of Water’s Position Paper. It is agreed that effective, quality planning is required for the future. This will require an increase in water management and a reform in legislation should address this to ensure that water resource entitlements are fair, equitable and endeavour to uphold the wellbeing and livelihoods of Western Australian communities. It is the WA Turf industry’s belief however that this position paper proposes a water reform which provides uncertainty rather than certainty in regards to long term security of access to water and water allocations.

The introduction of amendable water allocations, either seasonally or periodically altered, causes the turf industry grave concern. Amendable allocations would not provide agricultural and horticultural production industries, public open space managers and providers, local government agencies or other irrigation managers with confidence or the ability to plan water use over a year. Whilst legislation and the administration of water resources may be flexible and adaptable to short term variability, irrigated turf on the farm and in public open space is not. All irrigated vegetation, whether it is turf-grass or fruit and vegetables, is reliant on a particular water application to survive. It is unrealistic to expect these living plants to be able to adapt to sudden changes in water allocations without the risk of reduced quality or availability.

The turf production and maintenance sectors are ever mindful of water usage and allocations limitations. Watering schedules are completely amended over cooler months to save water. This allows for utilisation of allocation at the time when it is most needed, in the hotter months. The Department of Water is obliged to acknowledge that “water consciousness” has been a matter of great importance to the vast majority of community, (inclusive of those who utilise ground water for business purposes), for an extended period of time now. It is agreed that water for food production is of highest priority and justly so. However, we are disappointed about the lack of acknowledgement in this position paper as to the social and recreational values of water.

We agree that the management and allocation of water resources needs to adapt to climate change pressure. However, the review of the Position Paper does not provide information on how the Department intends to provide water users with security in their allocations. Amendable allocations are gravely concerning. To resolve this, we suggest that allocations remain fixed and unchangeable for the tenure of the licence. Fixed allocations will instil confidence for all, so that, for example crop production, irrigation of POS remains secure as far as practicably possible. An amendable license does not provide security or certainty in terms of being able to function into the future.

In recent years the Department of Water unofficially set a benchmark of 7,500 kilolitres per hectare per annum as allocation for POS. We ask the question, exactly how did the Department arrive at this amount? It is considered widely in the turf industry that the 7,500 kilolitre per hectare “benchmark” and allocation is not sufficient for those open spaces which are highly utilised by the community (i.e. sporting reserves, active open space) and therefore in peak use periods, where natural water delivery is almost nonexistent, the adherence to this benchmark is near impossible. The allocation is not sufficient and therefore, in the absence of appropriately questioning other efficiency measures, water consumption in comparison to the benchmark will indicate “inefficient” or “wasteful” use of water resources, when rather the contrary is true. Benchmarks in reality should adequately and realistically reflect the function of the water use (for example irrigation of passive open space versus the irrigation of active open space) and incorporate other measures of efficiency (i.e. system efficiency, system management).

The WA Turf Industry believes that statutory water plans should adequately set aside water for the community in the form of shares within the consumptive pool in a similar process to that which secures water for the environment. Therein, the statutory water plans set aside water for use in purposes which benefit the community (i.e. POS irrigation) and that the entitlement to access these
shares should only be granted to identities who are providing a community service (i.e. public open space providers inclusive of local government). This would provide the community and water users with security and confidence that water entitlement and allocation is less at risk of being affected. This would provide a positive result for community, as there would be confidence that public amenity and community wellbeing are less likely to be impacted upon.

The WA Turf Industry is aware that there are very real challenges in regards to water security with climate affected change, this is not the only factor for concern though as we are experiencing unprecedented state growth. “Perth's population will increase continuously from 1.9 million in June 2012 to between 4.4 million and 6.6 million in 2061, according to the projections”. We are already experiencing urban development in the northern corridor of the metropolitan area, with suburbs arising in areas of less water availability and allocation. A drying future along with unprecedented population growth is resulting in significant urban infill reducing the availability of private green spaces where people can connect to nature and maintain their health and wellbeing. Developmental and planning decisions pose further challenges to our communities and water resource and there is a community expectation that new water sources need to be actioned sooner rather than later. Few would be keen to live in desert, nor should they be expected to. Perth and the South West in particular are renowned as recreational oasis for all; we are of the belief that with the correct processes in place this can be maintained. The current lifestyle and values held by West Australians should be incorporated and acknowledged when developing water reform. The social and recreational value of water along with the value and importance of natural green space in an urban environment really must be honoured.

In many metropolitan areas and most regional areas, the only remaining natural green open space adequate enough to enhance or uphold a community's wellbeing are those provided and maintained by local governments. With new developments and planning changes, areas of passive POS are getting smaller and smaller, and even these areas are affected as councils take water from their allocations to cover the higher requirements for larger active sporting reserves. Already it is not uncommon to see local parks dead or dying as POS managers shuffle allocations to serve what they see as the higher priority areas. Imagine what it would be like if the allocations were amendable and could be reduced in drier times. Each of these areas serves a purpose and is beneficial to their communities' wellbeing; they also often provide a sanctuary for flora and fauna. It is therefore highly important that water resources are secured for use in public open spaces.

All levels of government need to acknowledge that the message to the community is one which is united, transparent, honest, clearly defined and understandable. There must be a clear direction in water resource management, not one which is changing and therefore uncertain.

CONCLUDING COMMENTS

The WA Turf Industry is confident that, with the above feedback and comments incorporated into the reformed legislation and reform process, and through an ongoing collaboration with the Department, that the wellbeing of our communities, our way of life, can be maintained to a level which is satisfactory and healthy during a drying climate.

The WA Turf industry;

- Urges the State government and its departments to fund infrastructure for new water sources and opportunities, earlier than later. The industry supports development and implementation of appropriate infrastructure to provide further water sources earlier than later should demand remain static and not decrease by the 10 to 20 per cent anticipated. Costs increase with time, the earlier the better would see better cost benefit to our society.
• Strongly supports and urges government to increase substantially the amount of water recycled. We understand that currently 6% of water is recycled and that the target is for 30% recycling by 2030. We urge the state government and its instrumentalities to expedite significantly, increased recycling and aquifer recharge as a priority. We believe that that the projected 30% recycling target should be raised to at least double of projection. We believe that it is not an unreal expectation to aspire to at least 60-70% increase of target before 2030. We understand that currently 120 Gigalitres of storm water is exited into the ocean, regardless of the quality of this water, this amount is excessive and certainly wastage. Using this currently wasted water to replenish aquifers is considered a priority. We strongly support strategies to remedy this process, inclusive of sewer mining, as a matter of priority.

• Believes that a naturally green community is imperative to health and well being of our society. Natural Turf grasses play a critical role in the general health and well being of our society and as a result of increasing urbanisation and deforestation; they are becoming more and more important for human health. We fully support sound proposals that will see the maintaining of balance between lifestyle, the environment and water conservation to achieve this end. We believe that government departmental perspective that natural turfed areas and parklands are water guzzlers which should be minimised and even phased out are incorrect. A “brown” landscape is of no benefit to either the environment of our communities. It is dead and depressing and an unrealistic option for a vital community. Our government has a responsibility to do the best it can to maintain a healthy balance for the benefit of all. The quadruple bottom line is that natural turf provides social, health, environmental and economic benefits to our society.

• That water allocations should not be amendable unless in dire circumstance.

“When values are addressed and debated through an open and democratic process, there is little risk of the resultant behaviours being anything but sustainable. The danger comes not from democracy (in the ideal sense) but from ossified institutions which lose their resilience to respond to new situations, and then deny the value dimension of their own policies. Values as a concept and as a moral guide to practical behaviour (ethics) serves to lubricate the otherwise sticky gears of institutions. What is commonly regarded as bureaucratic behaviour can also be explained as the inevitable result of rules (institutions) excluding values in guiding behaviour. We need institutions, but we also need values. The good news is that both are always present; we just need to look.” Looking Beyond (and Below) Institutions: The Role of Cultural Values in Sustaining Water Resources. D. Groenfeldt 1

“The paradox of social sustainability in water allocation: Multiple social values but no social objectives
An institutional change analysis of a South Australian water allocation plans Virginie GILLET M.Sc.

“8.5. CONCLUSION

Few studies in water governance have paid attention to the way water institutions and water policies address social sustainability, the third and weakest dimension of sustainability. This is in spite of the increasing scarcity of water and its recognition as a basic element in the support of human life and one that cannot be substituted. This study therefore embraced this gap by examining from a social sustainability perspective a water allocation plan, a regional tool of water policy. To do so, it conducted a dynamic analysis of the process of water planning from a community perspective—the two convergences of the social sustainability literature and the theories of policy analysis—placed within a wider framework of institutional change. As a result, it investigated the main drivers and barriers that influence the water planning process and their influences on its social sustainability. It also presented a comprehensive picture of the intricate relationships of the rural community with water, based on five guiding principles of social sustainability. Accordingly, multiple social values of water have been identified locally, but paradoxically, no social objectives were introduced in the revised water plan. The study found nonetheless that the Lower Limestone Coast water allocation planning process achieved relatively good, although inconsistent, results in addressing social sustainability. However, it does so only through indirect, inconsistent and incomplete approaches to consideration of the social aspects of sustainability. This calls for more coherent and dedicated attention to be paid to social sustainability in water planning through a shift from mitigation of social impacts to adaptation and integration of social values, requiring, in particular, some form of protection such as the licensing of cultural and non-consumptive uses of water.

This research concurrently provides insights and recommendations for both policy makers and academics in the field of institutional change, social sustainability, and policy analysis and water governance.”
The Earth is shared by people and a range of plants and animals which is so wide that not all species have been, or ever will be, identified, or their functions understood. Despite the lack of detailed knowledge, it is clear that each of the physical, biological and chemical components of the Earth plays an important role in its structure and function. Furthermore, water is essential to people, plants and animals alike. Water management has traditionally been focused on providing enough for people to drink, grow their food and support their industries. Providing water to the "environment" is often viewed as a luxury which only rich countries can afford. As the world's population rises, there will be increasing demand to ensure that direct supply of water to the human race is given top priority. However, people cannot live by water alone and require the services of environment's life support system, which itself needs water to function. Sound water management should, therefore, focus on the global ecosystem and not as a conflict against nature to supply water for people. Mutual survival of people and the environment means that the ten principles of water management must be followed. Water must be: valued; used sustainably; administered by suitable institutions; viewed through a social and cultural perspective; equally accessible to all; developed through the use of appropriate technology; cared for by treating the causes of problems and not just their symptoms; managed through an ecosystem approach; and dealt with by multidisciplinary teams which collect and disseminate a wide range of information to produce sound decision making. "Principles of Water Management for People and the Environment Michael Acreman, Freshwater Management Adviser to the IUCN, Institute of Hydrology, United Kingdom

The WA turf industry financially and in kind supports turf and water related research at the University of WA. We are proud members of the UWA Turf Industries Research Steering Committee. A pertinent and current UWA Turf Research project (TU11012) outline is below.

Effectively Utilising Water Allocations for Managing Turfgrass in Open Spaces

Project Aims
The overall objective of our field-based project (TU11012) is to investigate approaches to best manage current and future water allocations to turfgrass in public open spaces. Optimising irrigation scheduling and reducing the incidence of soil water repellence have been identified as approaches for optimising water allocations to turfgrass grown on sandy soils. Consequently, the project will:

- Investigate if turfgrass can be maintained with a water allocation and the implications of further lowering the allocation
- Evaluate how an annual water allocation is best distributed during the year
- Assess if applying a wetting agent improves the effectiveness of a water allocation.

Experimental Approach
Approaches for effectively utilising a water allocation for turfgrass are being investigated at the University of Western Australia’s Turf Research Facility in Perth. The site provides the infrastructure necessary for accurately assessing turfgrass management practices, including a variable-speed travelling irrigator that allows water to be applied evenly and at known rates. Experimental plots were planted in September 2011 utilising turfgrass harvested from a local government park that included a 25mm mat layer with the potential to become water repellent. The experiment started in July 2012 which allowed time for the turfgrass to become established. To address the three research aims, a factorial experimental design will be used so that combinations of water allocation amounts, watering schedules and soil wetting agent use can be evaluated to maintain turfgrass in a public open space scenario. Consequently, the experimental design for a series of 10m2 plots is:

3 water allocations x 3 irrigation schedules x 3 wetting agent rates x 3 replicates

The three water allocations are 5000, 6250 or 7500kL/ha/y. Currently, 7500kL/ha/y is allocated to public open spaces in Perth. The three irrigation schedules will be calculated using historical weather data from the Bureau of Meteorology and will be further refined using an onsite weather station and soil moisture probes. Details of the three irrigation schedules are provided in the panel opposite. Finally, a soil wetting agent will be applied at three rates:
- nil (control),
- At the manufacturer’s recommended rate
• Double the manufacturer’s recommended rate.

The wetting agent included in the study is widely used by the local turfgrass industry and its effectiveness has been demonstrated in independent studies.

Measurements
Turfgrass growth and quality as well as the development of soil water repellence under the different water allocation treatments will be assessed for three years in the field. Turfgrass growth will be determined by measuring a number of parameters. Turfgrass growth will be determined by measuring the dry weight of clippings after each mowing event (weekly) and by measuring the shoot biomass at the start and end of the experiment. In addition to good growth, turfgrass managers are required to produce a turfgrass surface with good colour. Consequently, turfgrass colour will be measured monthly using a Chromameter, and at the same time soil water content in the surface soil will be measured using a portable theta probe. Soil water repellence will be measured monthly during the irrigation season using both the ‘water droplet penetration time’ and the ‘molarity of ethanol droplet’ tests.

Research Outcomes
The benefits of this research to the turfgrass industry and community include cost-savings, improved turfgrass surfaces, better environmental management and an improved public perception of turfgrass management. Turfgrass managers have been involved with the design of the project and they will be able to view project outcomes at regular field days. A workshop will be held at the completion of the study and research findings will be presented in journals and at various conferences.

Acknowledgements
This project has been facilitated by HAL in partnership with the turf industry. It is funded by contributions from a consortium of local government authorities, Organic 2000, TGAA WA and the Tuf Growers Association WA, The Botanic Gardens & Parks Authority, Department of Education, Department of Sports & Recreation, Department of Water, GMA, WA Golf and the Cottesloe, Lake Karrinyup, Mt Lawley, Royal Perth, All Seasons Sanctuary Resort, Wanneroo, Busselton and Bunbury golf clubs.

The City of Belmont is thanked for providing turfgrass for the research site. The cities of Perth and Stirling, WA Bowling Association, Globe and MowMaster are thanked for in-kind support. Members of the UWA Turf Industries Research Steering and subcommittees

Irrigation schedules to be tested (HAL project TU11012)

Historical Monthly Budgeted
• Water allocated based on historical evaporation and rainfall data for Perth, whereby the allocation is divided into monthly quantities (Sept to Apr).
• The allocation for each month is calculated by multiplying the annual water allocation by the proportion of the annual net evaporation that occurs in that month. For example, if 20% of total annual net evaporation occurs in January, then 0.2 x 7500 = 1500kL/ha would be applied in January.
• Monthly allocation then divided by the number of irrigation days per month to calculate a daily water application.
• Water applied 2-5 days per week, depending on the time of year.
• This approach enables water to be distributed throughout the year based on historical climatic data, but does not enable water to be saved for later in the irrigation season should there be below average evaporation or above average rainfall in particular months.

Real-time Daily
• The first monthly allocation for the irrigation season calculated as above, but expressed as a % replacement of net evaporation. For example, if annual net evaporation is 15000kL/ha based on historical data, and the annual allocation is 7500kL/ha, net replacement is 50%.
• Turfgrass irrigator programmed to replace the calculated replacement net evaporation during the month.
• At the end of each month, the total amount of water applied since the start of the irrigation season is subtracted from the remaining annual allocation and the % replacement value recalculated.
• Water applied 2-5 days per week, depending on the time of year.
• This approach enables day-to-day climatic conditions to influence the irrigation application, with the potential to save water for later during the irrigation season.

Real-time Daily Integrated
• Irrigation decisions based on a combination of sources, including historical climatic data, current climatic data and soil water monitoring.
The first monthly allocation will be calculated as above; however, irrigation will only proceed if the soil water content is below a critical value.

At the end of each month, the total amount of water applied since the start of the irrigation season is subtracted from the remaining annual allocation, and the % replacement value recalculated. Run times are flexible, but still only watering up to 5 days a week.

This approach further refines option two given above, with additional potential for water savings during times of low demand (i.e. lower net evaporation or with rainfall inputs).

History of the UWA Turf Research Program

Background
Turf managers and society are seeking more efficient systems for delivering consistent and high-quality turf surfaces that enhance, rather than impact on, the environment. The UWA Turf Research Program works in collaboration with the Australian Turf Industry to provide the quantitative information required to develop best management practices for water and nutrient use in turf culture. Turf is a major component of the urban landscape in Australian cities; metropolitan Perth contained 13,500 ha of grassed areas in 1990. The general community, as well as the Turf Industry, will benefit from best management practices that maximise turf quality, while minimising environmental impacts such as water consumption and nutrient leaching.

The research program has been developed, and managed, in consultation with industry groups. A ‘Turf Industries Research Steering Committee’ was established in 1995 (Table 1), and this brought together stakeholders in the WA Turf Industry, Government, and Research arenas (Table 1) to set well defined goals. In 1997, the UWA Turf Research Facility was established at Shenton Park, approximately 8 km west of Perth’s CBD.

Table 1. Composition of the ‘Turf Industries Research Steering Committee’ as of December 2009. Several others have contributed to the committee during the period 1997-2009 (not listed).

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steve Atkinson</td>
<td>Water Corporation</td>
</tr>
<tr>
<td>Kim Bailey</td>
<td>Turf &amp; Landscape Industries Association</td>
</tr>
<tr>
<td>Louise Barton</td>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Julia Beijeman</td>
<td>WA Local Government Association</td>
</tr>
<tr>
<td>Nick Bell</td>
<td>Turf Consultant</td>
</tr>
<tr>
<td>Tim Colmer</td>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Aaron Compton</td>
<td>Department of Water</td>
</tr>
<tr>
<td>Glenn Craig</td>
<td>WA Bowling Association</td>
</tr>
<tr>
<td>Sam Flottmann</td>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Tony Guy</td>
<td>Sports Turf Association (WA)</td>
</tr>
<tr>
<td>Doug Hall</td>
<td>Waste Management Assoc. of Australia</td>
</tr>
<tr>
<td>Natalie Jagals</td>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Tracy Martin</td>
<td>Irrigation Australia (WA Region)</td>
</tr>
<tr>
<td>Ken Johnston</td>
<td>Turf Consultant</td>
</tr>
<tr>
<td>Darren Kirkwood</td>
<td>WA Turf Growers Association</td>
</tr>
<tr>
<td>Tracy Martin</td>
<td>Irrigation Australia (WA Region)</td>
</tr>
<tr>
<td>Paul Needham</td>
<td>WA Golf Course Supers. Ass</td>
</tr>
<tr>
<td>Dave Parker</td>
<td>Lawn Mowing Contractors Association</td>
</tr>
<tr>
<td>Pieter Poot</td>
<td>University of Western Australia</td>
</tr>
<tr>
<td>Eva Ricci</td>
<td>WA Turf Industry Development Officer</td>
</tr>
<tr>
<td>Toby Riseborough</td>
<td>Organic 2000</td>
</tr>
<tr>
<td>Warren Stephens (Chair)</td>
<td>Local Government</td>
</tr>
<tr>
<td>Brian Vidovich</td>
<td>WA Turf Growers Association</td>
</tr>
<tr>
<td>Paul Wright</td>
<td>Local Government</td>
</tr>
</tbody>
</table>

Purpose
To work in partnership with the Australian Turf Industry to develop science-based best management practices for water and nutrient use in turfgrass. Contribute to the development of the Australian Turf Industry and a sustainable environment for the citizens of Australia.

Research
Ten projects have been completed since the program commenced (see Table 1 for details), with two projects currently underway. A summary of current projects is provided below.

**Effectively Utilising Water Allocations for Managing Turfgrass in Open Spaces**
Louise Barton, Sam Flottmann and Tim Colmer

Southern Australia is expected to experience a significant decrease in water resources due to changing climate. Water allocation is a key water planning method being utilised for irrigating public open spaces. Our overall objective is to investigate approaches to best manage current and possible future water allocations to these turfgrass areas. Specifically, our field-based research is investigating:

- If turfgrass growth and quality can be maintained with an annual water allocation (7500 kL ha\(^{-1}\) year\(^{-1}\)), and the implications of lowering the water allocation;
- How best to distribute an annual water allocation during the year; and
- If applying a soil wetting agent improves the effectiveness of a water allocation, in terms of turfgrass quality.

Kikuyu grass plots were planted at the UWA Turf Research Facility in 2011, and were given 10 months to establish before applying water allocation treatments. The turfgrass was sourced from a local government park, and was considered to represent Perth’s public open spaces.

Water allocation treatments were developed in consultation with the UWA Turf Industry Research Steering Committee prior to commencing the field-based study. The treatments included three annual water allocations (5000, 6250 and 7500 kL ha\(^{-1}\) year\(^{-1}\)) distributed during the year using three different approaches: Monthly Budget where water is allocated based on historical evaporation and rainfall data; ET Replacement, where the first monthly allocation for the irrigation season is calculated as per the previous approach, but expressed as a percent replacement of net evaporation; and ET Replacement + Soil Moisture Probe, where irrigation decisions are based on a combination of sources, including historical climatic data, current climatic data and soil water monitoring. Finally, a soil wetting agent was applied at three rates: nil (control), at the manufacturer’s recommended rate, or double the manufacturer’s recommended rate.

We commenced investigating the effectiveness of the different water allocations (with and without a wetting agent) to maintain turfgrass growth and quality in July 2012. Turfgrass growth is being measured at least every two weeks, while turfgrass colour and soil water content is being measured every four weeks, during the three year field study. Soil underlying the turfgrass is also being tested for water repellence every four weeks during the irrigation season. Findings from the first year of the study will be included in the presentation.

Application of soil amendments to maintain turf quality on sandy soils under reduced irrigation
Pieter Poot, Louise Barton and Tim Colmer

**Table 2. Projects managed by the ‘Turf Industries Research Steering Committee’ during the period 1997-2009.**

<table>
<thead>
<tr>
<th>Title of Project</th>
<th>Date</th>
<th>Funding Partners</th>
<th>Major Industry Outputs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reducing water use by turf grasses in a Mediterranean environment: evaluation of diverse species</td>
<td>1997 to 2001</td>
<td>HAL (HRDC Project TU96002) Water Corporation, Waters &amp; Rivers, WA TGA, Organic 2000 MicroControl Engineering, WA GCSA &amp; WA GMA</td>
<td>PhD thesis by Digby Short 10 publications in industry journals Presentations at national and state conferences Several field days and site visits TV, radio, newspaper interviews Final report to HAL 1 publication in a scientific journal</td>
</tr>
<tr>
<td>Fly ash amendments to improve water and nutrient use in turf systems on sandy soils</td>
<td>1999 to 2002</td>
<td>Western Power, Ash Development Association of Australia</td>
<td>PhD thesis by Shahab Pathan 4 publications in scientific journals 3 publications in industry journals Presentations at international conferences and national meetings Several site tours</td>
</tr>
<tr>
<td>Project Description</td>
<td>Start Date</td>
<td>End Date</td>
<td>Contributors</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>------------</td>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Development of nutrient management systems for the WA turf industry</td>
<td>2001</td>
<td>2004</td>
<td>HAL (Project TU00007) Water Corporation, Waters &amp; Rivers, WATGA, Organic 2000 Scotts Australia, CSBP/Cresco, MicroControl Engineering, WA GCSA, City of Stirling, City of Nedlands</td>
</tr>
<tr>
<td>Evaluation of a soil moisture sensor control system for improved water use efficiency in turf</td>
<td>2002</td>
<td></td>
<td>Holman Industries</td>
</tr>
<tr>
<td>Evaluation of a soil moisture sensor to reduce water use and nutrient leaching in turf</td>
<td>2003</td>
<td></td>
<td>HAL (Project TU 02006) Holman Industries</td>
</tr>
<tr>
<td>Kikuyu Research Project</td>
<td>2005</td>
<td>2008</td>
<td>HAL (Project TU4001) Baileys Fertilisers, CSBP Ltd, Lawn Doctor, Micro Control Engineering, Organic 2000, PLA (representing a consortium of Local Government &amp; Government Authorities), TGGGA, WATGA, TurfMaster, WAGCSA, Water Corporation</td>
</tr>
<tr>
<td>Adaptation and management of buffalograss cultivars for water conservation</td>
<td>2006</td>
<td>2008</td>
<td>UWA component, HAL Project TU04008 (with QDPI&amp;F) WATGA, WA Palmetto Group WA Sir Walter Group, Brisbane CC, Buchanan Turf, H&amp;T Whiting, Lend Lease, Matilda Trading, Richmond Turf, Sod Solutions, Turf Force, TurfCo</td>
</tr>
<tr>
<td>Irrigation of halophytic turfgrasses with saline water</td>
<td>2006</td>
<td>2009</td>
<td>ARC Linkage Shire of Wagin DAFWA</td>
</tr>
<tr>
<td>Project Title</td>
<td>Years</td>
<td>Lead organisations</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>Evaluation of soft leaf buffalo cultivars: renovation, mowing heights, and water use</td>
<td>2009 to 2012</td>
<td>TGGA, WAGCSA, HAL (Project TU09005), Future Turf, Sir Walter WA Growers Group, TGAWA, Water Corporation, Western Australia</td>
<td></td>
</tr>
<tr>
<td>Effectively Utilising Water Allocations for Managing Turfgrass in Open Spaces</td>
<td>2011 to 2015</td>
<td>Australia Group Pty Ltd (TU TU11012) in partnership with the Local Government and the WA Turf Industry</td>
<td></td>
</tr>
<tr>
<td>Spaces Application of soil amendments to maintain turf quality on sandy soils under reduced irrigation</td>
<td>2013 to 2016</td>
<td>Industry</td>
<td>HAL in partnership with the WA Turf Industry</td>
</tr>
</tbody>
</table>

*Two fourth-year honours projects were also completed, but are not listed.
**In-kind support has also been provided by: WA Turf Growers Association, Golf Course Superintendents Association of WA, Sentek Environmental Innovations, City of Stirling, City of Melville, City of Canning, ALROH Turf Machinery, Nelson Australia, Total Eden Irrigation, Turbo Mulch, Casuarina Earthmoving & Transport, Murdoch TAFE.
*** Practical outputs for industry include: 1. Data on turf water use against which turf managers can benchmark their irrigation scheduling. 2. Recommendations on rates of fly ash to use as a soil amendment, understanding of the beneficial effects and environmental considerations. 3. Data on nutrient budgets for several fertiliser types and rates against which industry can benchmark fertiliser management to optimise turf quality, and minimise environmental impacts. 4. Information on potential water savings from use of soil-water sensor controlled irrigation scheduling. 5. The committee provides a ‘reference group’, our web site provides an easily accessible source of information for stakeholders, and the UWA research group provides a point of contact for the development of national and international collaborations and exchange of information. 6. Results from research at UWA have been incorporated into various guidelines (e.g. Water Corporation brochures for homeowners, WA Turf Growers Association Code of Practice) and manuals (e.g. TurfSustain).

---

**WATER USE & DROUGHT TOLERANCE IN TURF GRASSES**

**PhD Thesis Abstract**

*Dr Digby Short*  
Horticulture Australia Project TU96002 (1997-2001)

Improved practice in irrigation management of turf grasses may aid water conservation in Australia. Improvements in irrigation scheduling, however, require data on the water requirements of various turf genotypes. Irrigation requirements, impact of irrigation frequency, water use rates, and recovery from periods of low water supply were assessed for a diverse range of turf genotypes when grown in field plots in Perth, Western Australia. In addition, the establishment growth and seasonal performance of 11 turf genotypes in the field plots were also evaluated.

A variable-speed lateral boom irrigation system was developed for field-based irrigation trials. The irrigation system was used to apply discrete, precise and reproducible treatments to plots in close proximity. The field experiment consisted of 15 complete blocks, each 9 × 12 m, containing twelve 3 × 3 m plots, so that 11 turf grass genotypes (two C₃ and nine C₄ types) and one bare plot were randomised within each block. Each block was randomly assigned to one of 5 irrigation treatments applied each summer, so that there were 3 replicates of each treatment. The uniformity of application achieved using the variable-speed lateral boom irrigation system was excellent, with Christiansen’s coefficient of uniformity ranging from 92 – 96%. Moreover, the depths of irrigated water that the system could apply ranged from 1.8 to 18 mm, with an efficiency of discharge between 90 – 100%.
Minimum irrigation requirements of turf grasses were highly dependent on photosynthetic pathway; with C₃ genotypes requiring significantly more water than C₄ genotypes. To predict the minimum irrigation requirements of turf grasses, several shoot parameters were evaluated including: clipping production, leaf chlorophyll, canopy colour, green LAI and leaf water status. During the 1st summer (56 day irrigation trial) the minimum irrigation requirements of C₃ and C₄ genotypes were estimated at 64 – 94 % and 33 – 71% of Epan, respectively, when defined by the several shoot parameters. The lower irrigation requirements of C₄ turf grasses was associated with lower rates of evapotranspiration (ET) (ET in C₄ grasses was 58 – 71% of that in C₃ grasses; measured using lysimeters in the field plots) and deeper root systems (e.g. 16 – 46% of the total root biomass below 300 mm soil depth, except in Zoysia and Buchloe) in C₄ grasses, when compared to C₃ grasses.

During the 2nd summer (98 day irrigation trial), experimentation focused on the irrigation requirements of the C₄ genotypes; with estimates of minimum irrigation requirements being 37 – 74% of Epan, when defined by the several shoot parameters. The range of values for the estimated minimum irrigation requirement of the C₄ genotypes were due largely to variation between the responses of the various shoot parameters, rather than genotypic variation. Although, the average of several shoot parameters showed Zoysia and Buchloe required slightly higher (4 – 18% of Epan) irrigation levels, when compared to the other C₃ types. The maximum difference in mean ET rate among the C₄ genotypes tested was 8% of Epan, and although the results were reproducible the differences were not statistically significant.

Amalgamation of daily irrigations of 50% Epan into larger, less frequent applications did not result in significant improvements in turf performance. In fact, for several genotypes (Saltene, CT-2, Kikuyu, Zoysia and Buchloe) colour was reduced when irrigations were extended to every 3rd day. After prolonged exposure to severe water deficits, the capacity of the nine C₃ genotypes to recover was vastly superior to those of the two C₃ genotypes. Leaf chlorophyll concentrations and clippings produced by the C₃ grasses increased to be similar to those measured in leaves of the control plots within 28 days of recovery (irrigated daily at 100% of Epan).

The potential for osmotic adjustment in turf grasses was evaluated. Small declines in leaf $\pi_{sap}$ were estimated to be due to the accumulation of new solutes in the 11 genotypes. Glycinebetaine is a compatible solute that was present in the leaves of all 11 turf grasses (21 – 91 $\mu$mol g⁻¹ dry wt in leaves of control plots), however significant increases (i.e. 13-54 $\mu$mol g⁻¹ dry wt greater than controls) were only measured in Buffalo, Buchloe and the four Cynodon genotypes when exposed to declining irrigation.

In summary, traits such as deep, extensive root systems and lower ET rates improved the performance of turf grasses when irrigation volumes were reduced. The genotypic variation for ET rates among C₄ grasses was relatively small. Larger variation existed among the C₄ genotypes for the length and distribution of roots. The practical implications of this research demonstrate the opportunity for water conservation by using C₄, rather than C₃, turf genotypes in metropolitan Perth, and presumably other locations with mild winters and hot dry summers typical of a Mediterranean-type climate. However, there was relatively little variation in the ET rates and irrigation requirements among the nine C₄ turf grasses evaluated in the present study. The data on turf ET rates, and responses of growth and colour to declining irrigation provide the baseline data required by turf managers to ‘benchmark’ their irrigation scheduling.
Submission on

Securing Western Australia’s water future
Position paper – reforming water resource management

Due: 31 December 2013

Submitted to:
Water Reform
Policy and Innovation Directorate
Department of Water
PO BOX K822
PERTH WA 6842
E: policy@water.wa.gov.au

Prepared by:
Ms Lucy Radzikowska, Wool Executive Officer lucy@wafarmers.org.au
The Western Australian Farmers Federation (Inc)
Address: Ground Floor, 28 Thorogood Street, BURSWOOD WA 6100
Postal Address: PO Box 6291, EAST PERTH WA 6892
Phone: (08) 9486 2100; Facsimile: (08) 9361 3544
INTRODUCTION

The Western Australian Farmers Federation (Inc.) (WAFarmers) is the State’s largest and most influential rural lobby and service organisation. WAFarmers represents approximately 4,000 Western Australian farmers from primary industries including grain growers, meat and wool producers, horticulturalists, dairy farmers, commercial egg producers and beekeepers. Collectively our members are major contributors to the $5.5 billion gross value of production that agriculture in its various forms contributes annually to Western Australia’s economy. Additionally, through differing forms of land tenure, our members own, control and capably manage many millions of hectares of the State’s land mass and as such are responsible for maintaining the productive capacity and environmental wellbeing of that land.

WAFarmers welcomes the opportunity to comment on the “Securing Western Australia’s water future – Position Paper – reforming water resource management”

1. WAFarmers is pleased with the State Governments proposed changes to ensure that water, as a resource, will be available for primary producers; that the community is engaged in and understands the process used for water allocation and monitoring; and that there will be greater engagement with water users.

2. Water is a precious commodity within the agricultural sector. Land without adequate water is rendered unusable for agricultural use. Currently there is exemption from licensing for water used for stock and domestic needs. This exemption must remain for the non-intensive cattle and sheep enterprises and the definition of “commercial” more defined.

3. Consideration must be given for current water users within each region ensuring that water currently used for agriculture is not re-directed for other use.

4. Western Australia provides a large volume of agricultural and horticultural produce to the state, interstate and overseas. For the agriculture industry to keep up with population growth it is imperative that water for producing food is given priority when allocating water licences.

5. Primary producers in the agricultural regions of the State invest heavily in infrastructure, plant and equipment. Financial lending institutions need to be assured that the basic farm input of water will be available for the enterprise for the duration of the business life.

6. WAFarmers welcomes the development of a legislative framework for managing water in WA by amalgamating the various Acts under which water is currently managed.

7. WAFarmers welcomes the announcement that there will be an increase in the duration of the lifespan of a water licence, from the current maximum of 10 to 40 years. This initiative is very welcome and will provide much needed security, stability and certainty for the water using farm business. WAFarmers also supports perpetual water entitlements under consumptive pool arrangements but recognises the challenges and large DoW resources required in delivering that model. WAFarmers would like to see farm business owners with current short term licenses have the ability to convert them to the 40 year term at any stage instead of waiting for expiry. The license renewal process regardless of term must also be simple and provide certainty to the water using farm business.
8. Only limited information is provided in the document as to what will be involved in the simplified risk-assessment process. WAFarmers would welcome more information.

9. The establishment of water advisory groups is welcome and is strongly supported by WAFarmers. The local knowledge and peer network of advisory group members coupled with technical and scientific knowledge of the Department can and will provide good management of water resources across the State. This partnership approach to managing water at a local level is well received unlike typical government authoritarian methods. WAFarmers would also like to see the membership of advisory groups remain the same as outlined in the current RIWI Act 1914 where commercial water users have majority representation.

10. WAFarmers supports the provision of more water being available during wetter periods. However, there is concern as to what level of water may be taken away during the dryer times. These concerns can be overcome however if local advisory groups are genuinely engaged in the allocation decision making process.

11. WAFarmers supports a publicly available document to show permanent and temporary trades, however would not like to see extensive resources allocated to this area as water trading in WA will have very limited application due to the disconnected and fragmented type of resources.

12. WAFarmers welcomes the opportunity to comment on the proposed compensation framework in due course.

13. WAFarmers also supports the metering of all shared water resources such as rivers and groundwater systems where multiple users access the same resource, but would like to see alternative options of measurement available for farm dams due to their single user nature.

End.