

Turf Conference

Ray Moir
Turf Producers Australia
Limited

Project Number: TU05007

TU05007

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Know-how for Horticulture™

Final Report

TU05007

June 2006

Turf Conference

Principal Investigator:

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6150.

Purpose of Project

The foremost strategy for the National Turf Producers Conference 2006 'Turf and Water - a partnership for the future' is to assemble turf producers and allied turf managers and researchers from all over Australia and overseas in order to develop synergies and successfully technology transfer. It is also aimed at continuing the momentum and strong support achieved through the extremely successful National Turf Producers Conferences of 2003, 2004 and 2005.

Project Funding

Turf Producers Australia Ltd and Horticulture Australia Ltd combined to financially support the work of the Turf Producers National Conference held at Fremantle, WA.

Date of Report – June 2006

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Media Summary

The Turf Producers Australia 2006 Annual Conference was held in Fremantle, Western Australia from 18 – 20 April 2006. The theme for the 2006 Conference was “Turf and Water – A Partnership for the Future” and attracted a total conference attendance of 150 people over a two day period. The total conference attendance is made up of delegates, partners, exhibitors and guest speakers from every state and territory in Australia, and includes international delegates and speakers.

The conference began, informally, with Welcome Drinks and early registration in the Southern Cross Lobby of the Esplanade Hotel between 4.00pm and 7.00pm on Tuesday, 18 April 2006, giving delegates and exhibitors a chance to meet in a relaxed atmosphere prior to the conference opening.

The conference was officially opened at 9.00am on Tuesday, 18 April 2006 by Warren T Bell, President of Turfgrass Producers International and President of the International Turf Producers Foundation, following the welcome address by Robert Davey, President of Turf Producers Australia.

The Partner’s Day was run parallel to the first day of the conference proceedings on 19 April 2006 and included a visit to Kailis Pearls, followed by an excursion to King’s Park and lunch at Fraser’s Restaurant which overlooks the city of Perth. Conference delegates were joined by their partners, following the morning session with guest speakers’ topics on turf and water and an afternoon with the exhibitors, at Greenacres Turf Farm in Serpentine. Dinner was held at the turf farm before a return to the Esplanade Hotel later that evening.

Day two of the conference included morning sessions with guest speakers, an afternoon session on the proposed introduction of a Turf Levy, followed by an excursion to the University of Western Australia’s Turf Research facility.

The conference dinner was held at the Esplanade Hotel on the evening of Thursday, 20 April 2006 and included an informal address by The Honourable Sussan Ley MP, Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry and entertainment provided by local Perth band, Flavor.

For the 2006 conference, exhibitors were encouraged to register for all or part of the conference, to encourage communication and foster relationships between exhibitors and delegates. The feedback received from exhibitors is that the proximity of the exhibition space to the conference sessions, and therefore delegates, gave them increased exposure in comparison to previous years. This was true for both the Esplanade Hotel and Greenacres Turf Farm.

The feedback received from conference attendees was extremely positive, with 88% rating it as 4 out of 5 or above (where 5 = excellent). Most attendees stated that the conference highlight was the dinner held at Greenacres Turf Farm, and being able to mix with people in their industry.

Overall, it can be said that the Turf Producers Australia 2006 annual conference was a great success, and a profit of around \$30,000.00 was made. The major sponsors for the 2006 conference were Horticulture Australia Ltd and Bayer Environmental Science.

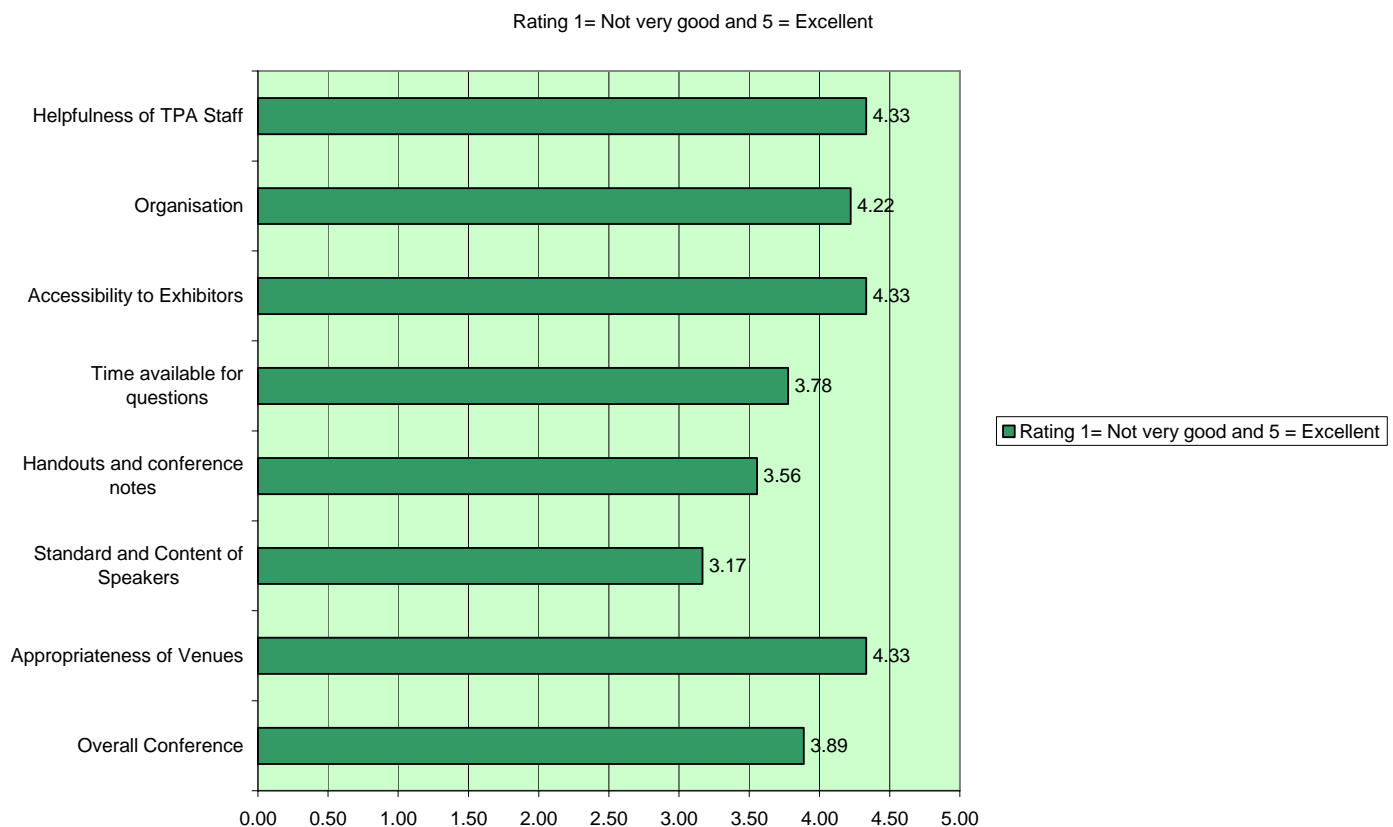
Evaluation of effectiveness

Successes

By far the most commented on aspect of the conference was the cheerful and helpful staff attending the registration desk. All comments were positive and people felt welcomed upon arrival.

The Turf Farm Dinner was a great success. Delegates enjoyed the atmosphere and the food, as did exhibitors. It should be noted that Exhibitors stated that the added bonus of being 'amongst the action' really helped them meet potential customers and increased their exposure. This was also true for the Exhibitor plan at the Esplanade Hotel.

The 2006 conference attendees were asked to complete evaluation sheets. Ratings were based on a scale of 1 to 5, where 1 = Not Very Good, and 5 = Excellent. Below are the results.



Challenges

Exhibitors were the hardest group to tie down for a commitment to the conference. The majority of Exhibitors did not register until April, and three Exhibitors registered within a week of the conference start date. This made it very difficult to determine how much room was required at venue/s. As a result, rooms were only released for re-hire to a third party at a very late stage, and as a result the TPA had to pay for the rooms that were not re-hired.

Exhibitors that had not registered for any part of the conference still attended breakfast and lunch at the hotel, thus the extra charges were paid for by the TPA.

Some conference attendees commented that the time spent at the Turf Farm was too long, by about an hour, for the afternoon visit.

It was difficult to determine how many people required transport back to the Esplanade Hotel from Greenacres Turf Farm, and as a result one of the coaches was not required.

Conference Program

2006 TURF PRODUCERS AUSTRALIA ANNUAL CONFERENCE

Tuesday 18 April—Thursday 20 April 2006



TURF and WATER

A Partnership for the Future

Invited Keynote Speakers include:

Hon. Geoff Gallop PhD, Premier of WA and Minister for Water. Opening address.

Jos Mensink, Director, State Water Strategy. WA Leads the Way – A Government in Partnership with Turf.

Dr Tim Colmer, University of WA. Turf, Water and Nutrient Management.

Colin Campbell, CID, Dip. Irrigation. Modern Irrigation Design.

Adrian and Peter Pitsikas will host an inspection of Greenacres Turf Farm, leaders in cutting edge irrigation technology.

John Forrest, M.Agr (Turf Management). The Future of Effluent/Recycled Water for Turf Grass.

Keith Bodman, M.Sc, Director, Primary Industries, Science and Natural resources, Challenger TAFE. Education for Turf Growers.

Clinton Skeogh (HAL). Marketing Turf in a Competitive Environment.

Peter McMaugh, B.Sc.Agr. Turf Grass for the Future in a Diminishing World of Water.

John Brennan, Water Efficiency Planner, Water Corporation of Western Australia. Marketing Turf During Water Shortages.

Conference headquarters for 2006 is the Esplanade Hotel in the heart of historic Fremantle, Western Australia. The Esplanade Hotel has a four star rating and is located just 30 minutes from Western Australia's capital city of Perth, and only 30 minutes from both the International and domestic airports. The hotel overlooks green parklands, the Indian Ocean and Fremantle's Fishing Boat Harbour. A leisurely stroll will take you to Fremantle's cafés, cosmopolitan restaurants, fashionable bars, cinemas, nightclubs and galleries, market bazaars, shopping and numerous historical attractions.



Thank you to our sponsors for helping to make the 2006 conference possible.



2006 TURF PRODUCERS AUSTRALIA ANNUAL CONFERENCE

2006 Conference Program Partnership for the Future

TURF and **WATER** – A

Tuesday, 18 April 2006

- 4.00 – 5.00pm** Conference Registration – TPA volunteer welcome desk for delegates, Southern Cross Lobby
- 5.00 – 7.00pm** Welcome Reception– an opportunity for conference participants to wind down and get to know fellow members and conference guests in a relaxed atmosphere.

You will need to make your own arrangements for dinner and our conference receptionists will have a variety of suggestions for you to select from, or make your own choice by taking a stroll through the Fremantle café district.

Wednesday, 19 April 2006

- 7.00 – 8.45am** Breakfast. Please be ready for a 9.00am start
- 8.00 – 8.45am** Conference Registration – TPA volunteer welcome desk for delegates, Southern Cross Lobby
- 9.00am** Welcome address by Mr Robert Davey, President, Turf Producers Australia and official opening of the conference by the Hon. Geoff Gallop, PhD, Premier of Western Australia and Minister for Water
- 9.30am** WA Leads the Way – A Government in Partnership with Turf. Jos Mensink, Director, State Water Strategy
- 10.15am** **MORNING TEA**
- 10.45am** Update on Research on Turf, Water and Nutrient Management. Dr Tim Colmer, University of Western Australia
- 11.30am** Modern Irrigation Design. Colin Campbell, CID, Dip. Irrigation
- 12.00pm** Panel – Open Forum for questions from the morning's proceedings.
- 12.30pm** Buses leave for Turf Farm Inspection – Cutting Edge Irrigation Technology
- 1.00pm** **LUNCH**
- 2.00pm** Inspection of Greenacres Turf Farm and sponsor exhibits with Hosts Adrian and Peter Pitsikas
- 5.00pm** Time for a well deserved break and an icy cold beer, or for those of you who prefer, some of WA's finest wines from the acclaimed Margaret River Region and Swan River Valley. You will dine at the farm with beer, wine and soft drinks provided. The bus will depart from the Turf Farm at 9.15pm for a 10.00pm return to the Esplanade Hotel.

Thursday, 20 April 2006

- 7.00 – 8.45am** Breakfast. Please be ready for a 9.00am start.
- 8.00 – 8.45am** Conference Registration – TPA volunteer welcome desk for delegates, Southern Cross Lobby
- 9.00am** The Future of Effluent/Recycled Water for Turf Grass. John Forrest, M.Agr (Turf Management).
- 9.45am** Education for Turf Growers. Keith Bodman, M.Sc, Director, Primary Industries, Science and Natural Resources, Challenger TAFE.
- 10.30am** **MORNING TEA**
- 11.00am** Marketing Turf in a Competitive Environment. Clinton Skeogh, Horticulture Australia Ltd
- 12.00pm** **LUNCH**
- 1.00pm** Turf Grass for the Future in a Diminishing World of Water. Peter McMaugh, B.Sc.Agr.
- 1.45pm** Marketing Turf During Water Shortages. John Brennan, Water Efficiency Planner, Water Corporation of Western Australia
- 2.30pm** **AFTERNOON TEA**
- 3.00pm** Buses leave for a private tour of the Kwinana Desalination Plant, led by Dr Jim Gill, Chief Executive Officer, Water Corporation of Western Australia
- 5.00pm** Return to Esplanade Hotel
- 6.30pm** Pre-Dinner Drinks
- 7.30pm** Conference Dinner, Guest Speaker and Entertainment

2006 Conference Registration Form

This form should be completed for each person attending the conference. Please photocopy this form or contact Karen Costello on 0431 833274 or via email at klcostel@bigpond.net.au for additional forms.

Name _____

Company _____

Position _____

Postal Address _____

Business Telephone _____ Fax _____

Mobile _____ Home Telephone _____

Email _____

Badge Name and Title _____

Special Requirements (e.g. dietary, access) _____

(If not already provided, please ensure that you supply your email address as this enables us to provide you with immediate updates should any changes occur.)

Conference Packages

Member and Non-Member - The Registration fee includes the welcome drinks, breakfast, lunch and dinner on the Wednesday and Thursday of the conference, all conference sessions and transport to and from the Esplanade Hotel for all conference activities.

Partner - The Registration fee includes the welcome drinks, an outing on the Wednesday morning to Kailis Pearls in Fremantle, followed by lunch at Fraser's Restaurant in Kings Park, Perth and travel to Greenacres Turf Farm for dinner before returning to the Esplanade Hotel that evening. Also included is the cost of the Conference Dinner and breakfast on Wednesday and Thursday.

Exhibitor - Please see separate registration form, overleaf.

(Circle that which applies - for conference options, see below for details)

Early Bird Registration - Registration and payment must be received by 31 January 2006

Member	\$671	Non-Member	\$742.50	Partner	\$440
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Registration and payment received after 31 January 2006

Member	\$742.50	Non-Member	\$825	Partner	\$467.50
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Conference Options

If you will not be attending all conference activities, select the activities that you will attend from the following list.

(Tick all that apply)

		Member	Non-Member	
I will be attending the Tuesday evening Welcome drinks	Add	\$ 60.50	\$ 66.00	
I will be attending the Wednesday Breakfast	Add	\$ 27.50	\$ 33.00	
I will be attending Day One of the Conference only	Add	\$247.50	\$264.00	
I will be attending the Turf Farm Dinner	Add	\$137.50	\$165.00	
I Will Be Attending The Thursday Breakfast	Add	\$ 27.50	\$ 33.00	
I will be attending Day Two of the Conference only	Add	\$247.50	\$264.00	
I will be attending the Conference Dinner	Add	\$137.50	\$165.00	

TOTAL AMOUNT TO BE PAID

\$ _____

Method of Payment *(Circle that which applies)*

Cheque

Money Order

Visa

MasterCard

Credit Card Number ____/____/____/____

Expiry Date __/ __

Name on Card _____

Please make ALL CHEQUES PAYABLE to TURF PRODUCERS AUSTRALIA and fax your 2006 Conference Registration Form to (08) 9332 0541 or by post to TPA 2006 Annual Conference, 29 Hogarth Way, BATEMAN WA 6150.

Please direct any queries that you may have about the conference to Karen Costello, on 0431 833274 or via email to klcostel@bigpond.net.au or Ray Moir on 0427 320 541 or via email to raymoir@bigpond.net.au

**ALL PRICES ARE
INCLUSIVE OF GST**

2006 Exhibitor Conference Registration Form

This form should be completed for each person attending the conference. Please photocopy this form or contact Karen Costello on 0431 833274 or via email at klcostel@bigpond.net.au for additional forms.

Name _____

Company _____

Position _____

Postal Address _____

Business Telephone _____ Fax _____

Mobile _____ Home Telephone _____

Email _____

Badge Name and Title _____

Special Requirements (e.g. dietary, access) _____

(If not already provided, please ensure that you supply your email address as this enables us to provide you with immediate updates should any changes occur.)

At the farm gate the turf industry is valued at over \$450 million to the Australian economy.

This is a great opportunity for you to gain exposure for your products and highlight what you have to offer to this multi-million dollar industry.

Turf Producers Australia invites your company to exhibit at our industry gathering in 2006.

Our industry is growing and expanding and we are very aware of its future. The conference theme “**TURF** and **WATER** – A Partnership for the Future” highlights that fact, making sure that in terms of technology, machinery, environment, finances and other related factors we need to be at the forefront. The program offers an excellent line up of key note speakers from with subjects focussing on real industry wide topics thus ensuring good attendances.

Gold and Silver Sponsorship Packages are available on application, and may include such opportunities sponsoring the conference dinner or a breakfast session, as well as the provision of individual booth spaces at the Esplanade Hotel and also outdoors at Greenacres Turf Farm. For more information, contact Ray Moir on 0427 320 541 or via email to raymoir@bigpond.net.au

Esplanade Hotel

All Exhibitors will be provided with a 3x3m booth frame & head board with “Velcro” compatible panelling boards and signage.

Greenacres Turf Farm

Generous equipment demonstration areas provide an excellent opportunity to show off your company’s products.

EXHIBITOR OPPORTUNITIES

(Tick that which applies)

<input type="checkbox"/>	Exhibitor Package 1 Registration, indoor display area at the Esplanade Hotel, plus display area at Greenacres Turf Farm	\$3,300.00
<input type="checkbox"/>	Exhibitor Package 2 Registration plus display area at Greenacres Turf Farm	\$2,200.00
<input type="checkbox"/>	Exhibitor Package 3 Display area at Greenacres Turf Farm only	\$1,375.00

TOTAL AMOUNT TO BE PAID

\$ _____

Method of Payment *(Circle that which applies)*

Cheque

Money Order

Visa

MasterCard

Credit Card Number _ _ _ _ / _ _ _ _ / _ _ _ _ / _ _ _ _
_ _

Expiry Date _ _ / _ _

Name on Card _____

Please make ALL CHEQUES PAYABLE to TURF PRODUCERS AUSTRALIA and fax your 2006 Conference Registration Form to (08) 9332 0541 or by post to TPA 2006 Annual Conference, 29 Hogarth Way, BATEMAN WA 6150.

Please direct any queries that you may have about the conference to Karen Costello, on 0431 833274 or via email to klcostel@bigpond.net.au or Ray Moir on 0427 320 541 or via email to raymoir@bigpond.net.au

**ALL PRICES ARE
INCLUSIVE OF GST**

Timing, Location and Organisation

Conference Dates

The conference will be held on Wednesday, 19 and Thursday, 20 April 2006.

Conference Venue

The Esplanade Hotel Fremantle Tel: (+618) 9432 4000
Corner Marine Terrace and Essex Street Fax:(+618) 9430 4539
Fremantle, Perth, Western Australia 6160 (Toll Free) 1800 998 201

<http://www.esplanadehotelfremantle.com.au>

Welcome Reception

Welcome drinks will be held on the evening of Tuesday, 18 April between 5.00 and 7.00pm at the Esplanade Hotel.

Registration Desk

The conference registration desk will be located in the Southern Cross Lobby of the Esplanade Hotel. The desk will be staffed at the following times:

Tuesday, 18 April 2006	4.00pm – 6.00pm
Wednesday, 19 April 2006	8.00am – 8.45am

Administration and Enquiries

The Event Manager is Karen Costello. Please direct any enquiries to her on 0431 833274 or via email to klcostel@bigpond.net.au

Dress Standard

The dress standard for all Conference sessions, the Welcome Reception and the Conference Dinner is neat casual.

Messages

A message board will be located near the Conference registration desk in the Southern Cross Lobby

Mobile Phones

All mobile telephones must be switched off before entering any of the sessions.

Personal Mail

All personal mail should be sent to your accommodation address. Contact details for the Esplanade Hotel are listed at the top of this form.

Program Changes

Please check the message board daily for any changes in the Conference Program.

Special Needs

We endeavour to ensure delegates with special needs are catered for. Should you require particular assistance, please contact the Event Manager, Karen Costello, or talk to the staff at the Conference registration desk on your arrival.

Organiser

The Conference is being organised by Turf Producers Australia Ltd.

Sponsors

The major sponsors for the 2006 conference are Bayer Environmental Science and Horticulture Australia.

Accommodation and Associated Services

Accommodation

We recommend that you book your accommodation at the Esplanade Hotel, as this is conference headquarters for 2006. Please complete the booking form that accompanies the conference registration form and return it directly to the hotel, as outlined on the accommodation booking form. Note: the room rate does not include breakfast, so if you will not be attending the breakfast sessions, you will need to make arrangements with the hotel, or make your own breakfast arrangements.

Airport Transfers

Travel to and from the conference venue, excluding organised activities, as outlined in the conference program, will be the responsibility of the individual.

Parking

Valet parking is available for registered resident hotel guests at a cost of \$12.50 per vehicle per day. For non-resident guests, a charge of \$22.50 per vehicle per day applies.

Alternative parking is available in the secure, undercover, multi-storey Collie Street car park situated adjacent to Esplanade Hotel. Parking Discount Tickets can be made available to delegates allowing them to park for the full day at a flat rate of \$6.00 per day (subject to change).

Should you wish to take advantage of the Parking Discount Ticket, you will need to make arrangements with the Event Manager at least one week prior to the conference.

Child Minding

The Esplanade Hotel concierge staff is able to assist in organising baby sitters for any in-house guests.

Conditions

Cancellations and Refunds

No refunds will be made for conference bookings within fourteen days of the conference, although substitutes will be allowed.

Disclaimer

The conference organisers reserve the right to change activities, topics and presenters where necessary. The organisers shall not be liable for any loss caused by the cancellation of the conference where such cancellation is due to 'Force Majeure'. The term 'Force Majeure' means any circumstance beyond the reasonable control of the organisers including but not limited to War, hostilities (whether war be declared or not), terrorism, aircraft hijacking, military operation, riot, civil war, rebellion, civil commotion or unrest, Acts or Regulations of government, refusal to grant visas, explosions, transport delays, transport difficulties and the insolvency of airline carriers. The organisers will use all reasonable efforts to conduct the conference despite the intervention or occurrence of any such cause.

Personal Insurance

Delegates shall be regarded in every respect as carrying their own risk for loss or injury to persons or property, including baggage, during the conference. The organisers strongly recommend that at the time of booking your travel, you take out a travel insurance policy.

The policy should include the loss of deposit through cancellation, medical insurance, loss or damage to personal property, financial loss incurred through disruptions to accommodation or travel arrangements due to strikes or other industrial action. The organisers are in no way responsible for any claims concerning insurance.

Privacy Policy

Your privacy is important to us. Your information will be stored by the Event Manager to manage your conference registration. We may also use this to protect ourselves against credit card and related fraud. This information will not be sold or provided to any third parties. Changes to this agreement may occur at any time, however, delegates will be notified through the email or postal address they have provided.

Other Information

Banks

Banking hours may vary, but most suburban and city banks are open from 9.30am to 4.00pm Monday to Thursday, and 9.30 am to 5.00pm on Friday. Most suburban and city banks have after hours auto teller facilities.

Nightlife

The Event Manager has made arrangement with local night clubs for conference delegates to gain free entry into their establishment. If you are interested, please ask at the Conference Registration desk on arrival, or contact the Event Manager.

Smoking

Visitors should be aware that smoking is banned in Western Australia in all public buildings and restaurants.



Turf Producers of Australia National Conference

ACCOMMODATION BOOKING FORM

CREDIT CARD NUMBER:

_____/_____
/_____

_____/_____/_____
EXPIRY DATE: _____

CONTACT PERSON: _____

SIGNATURE: _____
/_____/_____

DATE: _____

ACCOMMODATION CAN BE RESERVED BY THE FOLLOWING OPTIONS

EMAIL: reservations@ehf.com.au

TELEPHONE:

+618 9432 4000

FAX: +618 9432 4836

TOLL

FREE N^o: 1800 998 201

MAIL TO: Reservations, Esplanade Hotel Fremantle, PO Box 1102, Fremantle, Western Australia, 6959

CANCELLATION/NO SHOW POLICY

In the event of cancellation forty-eight (48) hours or less prior to arrival or in the case of non-arrival the Hotel will charge a cancellation fee equal to the first nights accommodation.

PARKING

Valet car-parking is available to each registered resident guest at a fee of \$12.50 per vehicle per day. The use of this bay is not transferable.

Delegate List

Conference Budget - Revenue & Expenditure

Budget totals for both revenue and expenditure are as follows:

REVENUE	\$176,270.00
EXPENDITURE	-\$146,087.79
PROFIT/LOSS	\$30,182.21

Conference Attendance

Revenue for the conference consisted primarily of delegate registrations. A total of 150 people attended the conference over its two day duration. Attendance (registration) types, income and complimentary values for each are listed below.

Registration Type	Number
Delegate	89
Exhibitor/Delegate	19
Exhibitor	9
Guest Speaker	11
Partner	22
Totals	150

Registration Type	Number	Revenue*	Complimentary
Delegates	99	\$56,370.00	\$24,890.50
Exhibitors**	29	\$36,625.00	\$3,300.00
Partners	22	\$8,778.00	\$1,837.00
Sponsors	2	\$41,250.00	\$0.00
Totals	150	\$143,023.00	\$30,027.50

*Revenue includes refunds

** Some Exhibitors also registered as delegates. The delegate registrations are included in the delegate total.

COMPANY	SURNAME	FIRST NAME	POSITION	REGISTRATION TYPE
Advanced Seed	Ahearn	Mick	Sales Manager	Delegate
Tropical Lawns Pty Ltd	Anderlini	Terry	Director	Delegate
Lockyer Lawn Services	Bachmann	Leon	Managing Director	Delegate
Hillside Turf	Barret	Jason	Manager	Delegate
Iluka Resources Ltd	Bultitude-Paull	John	Principal Process Engineer	Delegate
Horticulture Australia Ltd	Burgess	Stuart		Delegate
Strathayr Pty Ltd	Casimaty	Frank	Managing Director	Delegate
Strathayr Pty Ltd	Casimaty	Kate	Director	Delegate
Down South Turf	Clayton	John	Owner	Delegate
Future Lawns	Cleanthous	Paddy		Delegate
Evergreen Turf Pty Ltd	Cloete	Fanus	Director	Delegate
Anco Turf	Cotter	John	Owner	Delegate
Caboolture Turf	Cross	Sarah		Delegate
Caboolture Turf	Cross	Tony	Manager	Delegate
Turf The Lot	Cuddy	Chris	Marketing & Production Manager	Delegate
Orara Turf / Magnum Harvesters	Dargusch	Andrew		Delegate
Jimboomba Turf Group	Davidson	Lynn	Managing Director	Delegate
True Blue Turf Farm	Deale	Jimmy		Delegate
True Blue Turf Farm	Deale	Leonard		Delegate
Turf Force	Dennis	Burton	General Manager	Delegate
Turf Force	Dennis	Margaret		Delegate
Banksia Turf Pty Ltd	Drury	Vernon		Delegate
True Blue Turf Farm	du Plessis	Riaan		Delegate
Ozbreed Pty Ltd	Dutschke	Nathan	Grower Liaison	Delegate
Vasse Lawn Farm	Evans	Nick	Proprietor	Delegate
Vasse Lawn Farm	Evans	Wayne	Proprietor	Delegate
A G Buffalo Turf Supplies	Ferguson	Graeme	Owner/ Partner	Delegate
Marne Valley Turf Pty Ltd	Fleet	Doug	Owner	Delegate
	Flugge	Margaret		Delegate
Turfgrass Specialists	Garvey	Peter	Managing Director	Delegate
Rochedale Turf	Greasley	Robert	Managing Director	Delegate
Dept Agriculture, Fisheries & Forestry	Hancock	Peter	Manager, Horticulture Policy	Delegate
Cobbity Turf	Hatton	Geoff	Owner	Delegate
City of Greater Dandenong	Healy	Dave	Service Coordinator Turf Wickets	Delegate
Cabarlah Park Turf	Hindmarsh	Geoff	Managing Director	Delegate
Hillside Turf	Ivanoff	Ivan	Manager	Delegate
Yarramalong Turf	James	Dennis	Managing Director	Delegate
Lawn & Turf Services Pty Ltd	Jefferies	Bob	Director	Delegate
Noosa Turf	Johnston	Mike	Owner	Delegate
Australian Lawn Concept	Keleher	John	Managing Director	Delegate
West Coast Turf	Kirkwood	Darren	Owner / Partner	Delegate
Turf Force	Lenden	Peter	Sales & Marketin Manager	Delegate
Turf Developments (WA) Pty Ltd	Lindsay	Steve	Managing Director	Delegate
Turfmaster	Long	Gary	Farm Manager	Delegate
Lilydale Instant Lawn	Lusk	Denise		Delegate
Lilydale Instant Lawn	Lusk	Garry		Delegate
Greenfields Turf Farm	Maas	John	Owner	Delegate
Sportstuf Consultants (Aust) Pty Ltd	MacCartney	Ron		Delegate
Turfgrass Specialists	MacDonald	Alan	General Manager	Delegate
Sportsgrass Pty Ltd	Marchbank	James	Director	Delegate
Canturf	Middleton	Andy	Manager	Delegate
Millers Turf Supplies	Miller	Greg	Owner	Delegate
Millers Turf Supplies	Miller	Nicole	Owner	Delegate
Greenline Turf Supplies	Muscat	Alexandria		Delegate
Greenline Turf Supplies	Muscat	Michael		Delegate
Turfworld	Nunn	Paul	Owner	Delegate

Westland Turf	Paino	Con	Production Manager	Delegate
Westland Turf	Paino	Peter	General Manager	Delegate
Lawn Doctor	Parker	David	Managing Director	Delegate
Greenacres Turf Farm	Pitsikas	Adrian		Delegate
Greenacres Turf Farm	Pitsikas	Leanne		Delegate
Greenacres Turf Farm	Pitsikas	Peter		Delegate
Frontrunner Instant Lawn	Prince	Mick	Director	Delegate
Advanced Seed	Pullman	Rick	Sales Representative	Delegate
Buchanan Turf Supplies Pty Ltd	Redman	Brent		Delegate
RJ & ML Riley Pty Ltd	Riley	Maureen	Director	Delegate
RJ & ML Riley Pty Ltd	Riley	Rod	Director	Delegate
Turfco	Rogers	Gavin	Managing Director	Delegate
Turfco	Rogers	Sue		Delegate
Queensland Blue Turf Farm	Rzemek	Bradley	Director	Delegate
Queensland Blue Turf Farm	Rzemek	Eddy	Director	Delegate
NSW Dept Primary Industries	Senn	Ashley	District Agronomist	Delegate
Coolabah Turf Instant Lawn	Shearer	Brad	Managing Director	Delegate
Coolabah Turf Instant Lawn	Shearer	Suzie	Managing Director	Delegate
Ground Control Australia	Shields	Alan	Director	Delegate
Dept of Agriculture	Shimmin	Tony	Technical Officer	Delegate
Turbiz	Sinclair	Heather		Delegate
Turbiz	Sinclair	Steve	Owner / Proprietor	Delegate
City of Greater Dandenong	Smith	Michael	Parks Manager	Delegate
Earl's Turf	Stanley	Earl	Owner/Manager	Delegate
Earl's Turf	Stanley	Jenelle	Owner/Manager	Delegate
Anco Turf	Stephens	Bruce	Manager	Delegate
Twin View Turf	Stephenson	Max		Delegate
Frontrunner Instant Lawn	Stockden	Matt	Farm Manager	Delegate
Vidos Turf Supplies	Vidovich	Anthony	Owner	Delegate
Vidos Turf Supplies	Vidovich	Troy	Owner	Delegate
Sod Solutions	Wagner	Tobey	President	Delegate
Nuturf	Walker	Josh	WA State Manager	Delegate
	Williams	Verity	Assistant to Ms Ley	Delegate
				Delegate
Magnetic Events	Costello	Karen	Manager	Event Coordinator
				Event
Ray Moir & Associates	Moir	Ray		Organiser/Delegate
				Event
				Organiser/Partner
Ray Moir & Associates	Moir	Christine		
Bayer Environmental Science	Ahern	David	Regional Sales Manager	Exhibitor
McIntosh & Son	Carbery	Danny	Turf Sales	Exhibitor
CJD Equipment Pty Ltd (John Deere)	Durey	Chris	Regional Sales Manager	Exhibitor
Conwed Plastics	Hanna	Rob	Distributor	Exhibitor
CJD Equipment Pty Ltd (John Deere)	Jones	Simon	Regional Sales Manager	Exhibitor
Liftrite Hire & Sales	Smith	Paul	General Manager	Exhibitor
Triangle Filtration & Irrigation	Sparrow	Ivan	State Manager	Exhibitor
East West Engineering	Tenaglia	Nino	Sales Manager	Exhibitor
Orara Turf / Magnum Harvesters	Wilson	Bill	Manager	Exhibitor
Globe Australia Pty Ltd	Abel	Peter	Client Manager - QLD Turf	Exhibitor/Delegate
Nuturf	Adermann	Simon	State Manager	Exhibitor/Delegate
Evergreen Turf	Barker	Warren	Machinery Mechanic	Exhibitor/Delegate
Evergreen Turf	Buck	Matthew	Sales	Exhibitor/Delegate
Nuturf	Castiglioni	Gavin	Territory Manager	Exhibitor/Delegate
Evergreen Turf	Davey	Rob		Exhibitor/Delegate
Evergreen Turf	Davey	Wendy		Exhibitor/Delegate
Turfcraft International	Dowie	Alastair		Exhibitor/Delegate
Globe Australia Pty Ltd	Falappi	Lee	Client Manager - NSW Turf	Exhibitor/Delegate
Hydromist Pty Ltd	Hatton	Jason	Director	Exhibitor/Delegate
Evergreen Turf	Holden	Dean	General Manager	Exhibitor/Delegate
T-Quip	Knight	Dollin	Sales Consultant	Exhibitor/Delegate

Aspac Golf & Turf	Lewis	Steve	Product Manager	Exhibitor/Delegate
Evergreen Turf	Manning	Peter	Production Manager	Exhibitor/Delegate
Polymet Australia Pty Ltd	Ritchie	Linton	Director	Exhibitor/Delegate
Turf DATA-LINX	St. Quentin	David		Exhibitor/Delegate
Globe Australia Pty Ltd	Wells	Stan	Sales Manager	Exhibitor/Delegate
McIntosh & Son	Wright	Michael		Exhibitor/Delegate
University of Western Australia	Barton	Louise	Research Fellow, Plant Biology	Guest Speaker
Biograss Farms Inc	Bell	Warren		Guest Speaker
Challenger TAFE	Bodman	Keith	Director	Guest Speaker
Water Corporation	Brennan	John	Water Efficiency Planner	Guest Speaker
Hydroplan	Campbell	Colin	Principal Consultant	Guest Speaker
University of Western Australia	Colmer	Tim	Senior Lecturer	Guest Speaker
Challenger TAFE	Forrest	John	Lecturer	Guest Speaker
			Parliamentary Secretary to the Minister for Agriculture, Fisheries and Forestry	Guest Speaker
The Honorable	Ley MP	Sussan		Guest Speaker
Turfgrass Scientific Services Pty Ltd	McMaugh	Peter	Managing Director	Guest Speaker
Horticulture Australia Council	Newton	Kris	Chief Executive Officer	Guest Speaker
Horticulture Australia Ltd	Skeoch	Clinton		Guest Speaker
Tropical Lawns Pty Ltd	Anderlini	Robyn		Partner
Biograss Farms Inc	Bell	Tammy		Partner
Strathayr Pty Ltd	Casimaty	Anette		Partner
Anco Turf	Cotter	Robyn	Owner	Partner
Turf The Lot	Cuddy	Nerida		Partner
Marne Valley Turf Pty Ltd	Fleet	Diana	Owner	Partner
Turfgrass Specialists	Garvey	Pixie		Partner
Evergreen Turf	Holden	Michelle		Partner
Yarramalong Turf	James	Peggy		Partner
Lawn & Turf Services Pty Ltd	Jefferies	Sharon		Partner
Turf Force	Lenden	Vivienne		Partner
Strathayr Pty Ltd	Lowther	Sam		Partner
Greenfields Turf Farm	Maas	Jenny	Owner	Partner
Turfgrass Scientific Services Pty Ltd	McMaugh	Rae		Partner
Turfworld	Nunn	Bobbie	Owner	Partner
Lawn Doctor	Parker	Liz		Partner
Queensland Blue Turf Farm	Rzemek	Gloria		Partner
Bayer Environmental Science	Jackson	Paul	Sales & Marketing Manager - Turf	Sponsor/Delegate
Bayer Environmental Science	Wood	Craig	Regional Sales Manager	Sponsor/Delegate
	Flugge	Craig		

Recommendations

Future Considerations/Opportunities

Of the 150 in attendance, approximately 60 were non-members. It is recommended that the TPA take advantage of this and follow up with a membership drive. It would also be beneficial to include a TPA membership application with next year's registration package that outlines the benefits afforded to members of the TPA. This would not add considerably to the total cost for printing.

For next year, it is recommended that to include an Early Bird Registration (discounted) for Exhibitors in an attempt to have them commit to the conference at an earlier stage. It would also be prudent to include meals as part of the Exhibitor registration costs for future events.

With regard to transport requirements to and from venues, include a question on the registration form such as, "Do you require transport to/from X venue?" will reduce the guesswork for the number of coaches required at a particular place and time.

Acknowledgements

I would personally like to thank Ray and Christine Moir for their help and support, and for affording me the opportunity to work with such a great group of people.

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Proceedings

The Future of Effluent/Recycled Water for Turfgrass

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Abstract

Water is the most important resource required for growing turf in Australia. It is not possible to have a coverage of turf with little or no water for extended periods. Turf grown for passive or active situations requires irrigation water. Changing climates and increasing populations have put pressure on water resources especially for horticultural pursuits. Potable water is being removed as an irrigation source in many areas leaving enterprises with the unenviable task of finding another water supply. Recycled water is the obvious solution and these benefits are well documented through out the world. Recycled water is not at the enterprise's gate waiting to be pumped on line, and with the supply comes many questions that need to be analysed. Points to consider are access to a reliable supply, quantity of supply, economics, water quality and legislative requirements.

Key Words

recycled water, turfgrass, access, supply, storage, quality management, process of supply

Recycled Water Supply

Wastewater is a term that does not describe the importance and value of this water source from an economical and environmental perspective. Recycled water is a more appropriate definition of water that has been used for one process, collected and re-used. Collecting water for irrigating turf requires significant quantities therefore the supply must meet demand.

Waste water treatment plants (W.W.T.P.) are used though out Australia to supply treated sewerage water to industry, including horticultural & turf. Many regional areas rely on the treated sewerage water and stormwater to irrigate local sports facilities and parks. The quality of the water varies depending on the level of treatment. All of the Australian states discharge some of the treated effluent water to ocean outlets (Radcliff 2004). In Western Australia the discharge is approximately 100G/L per annum.

Storm water collection has the potential to supply large amounts of water. Hard stands such as roads, car parks and rooves have huge potential. A car park 40m x 50m in area that has an annual rainfall of 800mm will harvest at 100% recovery 1.60 ML per annum. Storm water collection requires careful design; predictions of collection quantities are difficult as rainfall events vary greatly. Over flow mechanisms are essential.

Storage of recycled water for irrigation of turf requires water on demand, in most situations an irrigation dam needs to be constructed. In many urban locations this is not feasible and other methods of storage are required. **ASR** (aquifer storage and recovery) is an option that has shown some success around the world. Storm water or secondary treated water from a WWTP can be pumped into an aquifer for storage. Aquifer storage addresses (Harvandi 1989) seasonal requirements as winter rains in most states remove the need to irrigate turf in winter. Wetlands are effective biological filtration systems for water before it is reused ((Greenway 2003), then pumped into aquifers or added to waterways. The Movement of treated recycled water from the source creates a storage requirement through periods of low or no demand, such as rainfall therefore reducing the need for irrigation. Large surface storage is not possible in urban areas where land is expensive with open water bodies requiring algae and aquatic weed management, plus increasing the possibility of mosquito problems (Dillion *et.al* 2005). No evaporation occurs under ground reducing salt accumulation. Turf facilities close to waste water supplies may find it economically feasible to access treated water due to lower water transfer costs. Turf producers are normally on the outskirts of urban areas and water supplies may need to come from different sources. In these areas water from industry is a possibility that could be utilised and there are examples of industry supplying wastewater after treatment to turf facilities, creating a use for water that would otherwise be a pollution source if added to rivers or streams for disposal. **Sewer mining** is an option in cases where there is enough water to meet irrigation demand. An on site treatment system is used to treat water that has been pumped from the WWTP with on site filtration producing water to an acceptable quality.

The turf plants ability to remove nutrients from the water is why; recycled water that has elevated N and P concentrations should be applied to turf improving the quality of water before it is returned to the greater environment (Pepper *et al* .1981).

A reliable supply of water is very important for users, as continuity of supply is essential for industries such as Turf Growers.

Cost

Cost recover is a term that is used when discussing the cost of recycled water and is very difficult to achieve in the short term especially when modification to treatment or delivery is necessary. Many schemes operating are not running at full cost recovery (Radcliffe 2004), this is a disincentive to potential investors. Why is industry going to use a water supply that is more expensive than water that is accessed at present? Limited access to a water supply is the most obvious answer as shown in various locations, with potable water access being restricted in many parts of Australia for irrigating turf. When localities such as Sydney impose mandatory (Sydney water 2006) level three water restrictions recycled water is exempt.

One factor in costing of recycled water that is difficult to calculate is the environmental or social consequence of discharging recycled water into the environment. In a report for the Australian Government Department of Agriculture, Fisheries and Forestry (2005) the main concern for users of recycled water is cost. Incentives will be required to encourage users to look at recycled water, however at present it is difficult to convince users to look at recycled water when existing water sources are available at a lower cost per k/L, raising the difficult question, is an appropriate price paid for water?

Quantity / Water Budget

Water budgets ensure that the user is aware of the amount of water required for the production and/or maintenance of turf on their property. Seasonal variations, future changes in crop variety due to community demands and size of production area are part of long term planning. Total enterprise water needs can be calculated with a focus on a daily budget for peak times to check demands can be met by supply. Water needs can be based on crop requirements, soil types and irrigation system efficiencies.

Quality

Crop tolerance, soil structure, property topography and locality determine the level of the treatment required for water to be of acceptable standard for irrigation. Recycled water often has varying degrees of contamination. High salt concentrations in some recycled water can affect soil structure impacting on infiltration and percolation of water through the profile; water movement through the plant can also be restricted. Nutrient imbalances impact on plant growth and a sound understanding of the management issues should be investigated and understood before recycled water is considered. The rate of salt accumulation is influenced by:

- Concentration in irrigation water
- Application rates
- Rainfall
- Evapotranspiration
- Soil characteristics-physical and chemical

(Lazarova *et.al* 2005)

Of the toxic ions that accumulate from the applications of treated wastewater in particular water received from WWTP sodium, chloride, bi-carbonate, carbonates and boron are the most damaging. Sodium is often the main concern as it affects plant growth directly and destroys soil structure.

Soil structure breaks down when high sodium concentrations create an environment where sodium replaces calcium and magnesium in the soil profile. Soils with higher cation exchange capacity and number of colloidal particles (soil particles that float in water) are influenced more than soils with large pore spaces such as sands. Sodium breaks up the structure of the soil (Ayers

and Wescot 1985) by allowing the soil to form a slurry (disperse) when saturated therefore reducing the ability for the soil to drain. A close analogy would be a concrete worker bringing fines to the surface of his/her concrete to finish the surface by having a saturated film where the fines float to the surface, or a cricket curator working fines to the surface to seal a wicket. Once the slurry dries it can form a seal and/or become hard making it difficult for water to penetrate resulting in dry patches in the soil and water deficits in plants between irrigation events. If the soil remains wet then anaerobic conditions prevail affecting plant growth. Determining sodium levels by the ESP (Exchangeable sodium percentage) is possible where a total cation exchange capacity is taken for the soil and a percentage of sodium is calculated in meq/100g of soil.

Exchangeable Na

ESP= Cation Exchange Capacity

SAR (Sodium absorption ratio) is a common method of assessing the sodium concentrations in comparison to calcium and magnesium enabling managers to assess the likelihood of soil structure problems.

$$SAR = \frac{Na}{\sqrt{(Ca + Mg)/2}}$$

(Carrow and Duncan 1998)

Maintaining calcium concentrations is essential to restrict sodium accumulations. Soil testing, even on sandy soils, shows the cation exchange and the percentage of the cations Ca, Mg, Na, and K indicating their ratio on the exchange sites. Once initial soil sampling is completed a database can be formulated to keep track of the ion concentration and the affect of any management practices that are put in place. Soil sampling alone will not give the full picture with tissue and water sampling assisting in data collection to identify any potential problems. Water sampling enables calculations to be made on any amendments that are required including adjustments to fertiliser programs by determining the amount of nutrients applied in the water. Tissue samples are another useful tool especially when pH readings are near neutral converting micronutrients to unavailable forms (Marschner, H. 1995), sampling tissue will indicate if the plant has taken up adequate amounts. In warm season grasses iron and manganese are locked out once soil pH is close to neutral, ≥ 6.8 (Forrest 2002). Gypsum is a product widely used to maintain calcium concentrations without increasing the pH as occurs when applying calcium carbonate (lime).

Chloride is another ion that can create problems with turf growth although the main problem is burning of the leaf. Chloride is easily leached from the soil.

Boron in the heavier soils can become toxic if concentrations become excessive. Bicarbonate and carbonates can also impact on soil structure and influence pH. High bicarbonate and carbonate concentrations in irrigation water can precipitate calcium and magnesium (McCarty *et.al* 2003) creating an environment where sodium levels will increase as competition for exchange sites is reduced.

Salt tolerance and management

Turf plants have varying ranges of salt tolerance, selecting crops that are more adapt at tolerating the quality of the recycled water. The ability to leach salts from the surface helps plants tolerate high salt concentrations; however this can be difficult on heavier soils with low infiltration rates. During the irrigation season salts will increase at the soil surface especially in arid areas where there is very little summer rainfall. Irrigating in the heat of the day can exasperate the problem, as evaporation rates are high, leaving behind an increasing salt concentration. Matching the infiltration rate with the application rate for irrigation water is important to stop pooling on the surface, which also increases salt concentrations. Enough water is needed to wash the salts deeper into the soil profile past the rootzone. Leaching Factors assist in determining how much irrigation is required to leach salts to an equilibrium that the plant and soil structure can tolerate.

Depth of water leached below the root zone

Leaching Fraction (LF) = $\frac{\text{depth of water applied at the surface}}{\text{depth of water applied at the surface}}$

(Ayers and Westcot 1985)

Calculating the rates of nutrients applied in applications of recycled water enable managers to reduce fertiliser application. When fertiliser is required, products with low salt indexes are recommended.

Future direction for the turf industry

There is no doubt that most would agree using recycled water is the path that needs to be taken and that there are many difficulties in introducing projects and managing them. A process is needed to enable industry to look at what is available to them and a total cost analysis so a business can decide on the most appropriate method for cost recovery on infrastructure and management. Water Authorities need to create feasible options with sound advice and expertise in guiding industry partners in the direction that is best. Governments must invest in the future and dangle a carrot for the suppliers and users to commit funds to use water sources that are not always the cheapest available in the short term. There are many excellent examples of recycling water used on turf facilities through out Australia however more education from suppliers on possibilities is an integral part of the future use of a water source that can ensure the continual growth of the turf industry. Guidelines should be researched and supported by sound scientific data with clear management procedures for turf producers and managers to follow.

Strict guidelines are required to protect all partners in the recycled water business however a clear process is required for potential users to be aware of all necessary requirements for applications for recycled water use. A contact list of whom to contact first, and what is required at each contact point. The process should be conveyed to staff of all necessary departments so they also understand the sequence, then sound advice can be given and businesses do not find the experience frustrating.

Conclusion

Water issues are at the top of the priority list in Australia with management of a valuable resource in the hands of government authorities, financial support with incentives through grants, subsidies and tax relieve can assist to implement schemes in recycled water use. Clear guidelines and direction need to be formulated so the process of sustainable water supplies is achievable to protect an Australian lifestyle quality that is surrounded by sport and recreation of which turf is one of the main components.

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MARKETING WATER and TURF
TURF PRODUCERS ASSOCIATION NATIONAL CONFERENCE
FREMANTLE 2006

John Brennan, Water Efficiency Planner, Water Corporation.

EXECUTIVE SUMMARY

The winter of 2001 delivered the lowest stream runoff since 1914 into the hills reservoirs which supply 50% of the potable water requirements for consumers connected to the Integrated Water Supply System (IWSS) which provided water to Perth. This situation was exasperated by the winter of 2004 which resulted in the lowest Perth rainfall for 27 years. To ensure continuity of supply, the Water Corporation determined that there was a need to reduce consumption by 45GL a year. Normal unrestricted consumption across all sectors (residential, commercial and industrial) was approximately 300GL, so the savings required were significant.

The equation was simple. However, success would require a dramatic change in the garden watering behaviour of 1.5 million consumers, many of whom had no experience of water restrictions and whose reaction to demands to limit their use of water was unknown. Could turf still be marketed in this situation?

INTRODUCTION

Climate change, decreasing rainfall, population growth and increasing demand for water, continues to put pressure on Western Australia's water resources. A consequence of this situation is the focus on planning the management of the State's water resources. The blueprint for this is detailed in the State Water Strategy which identifies that water use efficiency, not only securing additional water supplies, is an option which must be pursued aggressively. A priority area for efficiency gains is scheme water use. The Strategy sets a per capita target of scheme water use at 155kL by 2012, 16% lower than the pre restriction level.

The Water Corporation's residential customers use approximately 70% of the scheme water supplied to Perth. This means that to achieve the proposed 16% savings it will be necessary to modify household consumption patterns. Corporation studies indicate that a significant

proportion, in excess of 50%, of the scheme water used by single residence households who do not have a garden bore is used to irrigate lawns and gardens. Further, studies have shown that whilst in-house water use has stabilised over the last 20 years, the amount of water applied to household lawns and gardens has increased in excess of 50%.

To achieve water savings in the longer-term, a program to modify water use practices in the residential market, together with water restrictions in the short-term, was required. As it is the largest single area of use, a reduction in the amount of water used on lawns and gardens is the key to water savings. This situation placed the turf industry in a potentially precarious situation.

POLITICAL

In Western Australia, the Water Agencies (Powers) Act 1984 gives the Minister the power to make certain By-laws.

Stage 1 of the Water Restriction By-law is a permanent statewide ban on the use of sprinklers using scheme water between the hours of 9a.m. and 6p.m. This ban has been in place in the Perth Metropolitan area since 1994 and was extended statewide in 1998 to include all of the 113 independent and regional schemes operated by the Corporation. The limitations on water use increase with the various restriction stages, from being able to water on alternate days to the most severe, Stage 7, which prohibits all outside use.

SOCIAL

The West Australian community had little or no experience in dealing with situations where restrictions on water use are required. In fact, many communities have no experience of restrictions and the major population centre in Perth last endured restrictions in 1977/78 when the south of Western Australia was in severe drought. At that time the only option the Metropolitan Water Board had to cope with the situation was to introduce a total sprinkler ban. The single segment of the garden industry that flourished during the ban was garden bore installers. Turf producers and garden centres experienced a dramatic down turn in sales and many businesses folded.

RESTRICTIONS – SEPTEMBER 2001

During 2001, the south west corner of Western Australia and the agricultural areas experienced the driest start to a winter on record and this followed the driest summer on record. In a normal year, inflows to the surface storages would supply about 50% of the water delivered to the integrated system with groundwater abstraction accounting for the other 50%. In 2001, these inflows were the lowest since 1914. With storage levels in the 9 major surface storages at critically low levels water restrictions were required. The issue was what level of water restriction would be imposed? A total sprinkler ban would have a debilitating impact on the garden industry, especially the turf component of it.

The Corporation had determined that there was a need to save 45GL of water from an unrestricted annual demand of 300 GL (i.e. 15% across all water use sectors) if storages were to stay above 100GL (or 17% capacity) by the end of summer. The 100GL was determined as the minimum operational storage that could be achieved without compromising water quality criteria.

Given that 70% of the water delivered into this system is consumed by the residential sector, and more than half of this is used to irrigate gardens, there is limited scope to make reductions in commercial, industrial and institutional water use. There was a requirement to actually effect a reduction of approximately 20% in the residential sector if the 45GL saving was to be achieved.

WHAT DID WE KNOW?

Our customer research showed that they greatly valued their lawns and gardens and would not respond well to putting them at risk.

The Corporation had developed a strong association with the key garden/green industry groups, specially the turf industry over many years, and was therefore acutely aware of the potentially disastrous consequences of a total sprinkler ban on these businesses. The industry servicing the residential garden sector had matured since the 1977/78 restrictions and the imposition of a total sprinkler ban would have ravaged an important component of the local economy.

HOW DID WE INTERACT WITH GARDEN INDUSTRY?

The industry most affected by any form of restrictions would be the garden industry. This was a collective of industries that included turf growers, irrigation specialists, bore drilling contractors, nurseries, and lawn mowing contractors.

The Corporation had a long-standing working relationship with these components of the garden industry and had collaborated in the past on water conservation campaigns. However, restrictions, particularly the possibility of a total sprinkler ban, represented a very real threat to their livelihoods.

In recognising this, as soon as it became apparent that some form of restriction would be inevitable, the Corporation established a Garden Industry Reference Group. This group was brought together with the aim of exchanging views and information, and co-ordinating community education efforts. From the Corporation’s perspective it was vital for these industries to remain “on-side”, even in the face of what was undeniably a major threat to them.

The Corporation presented this group, which included Ray Moir, President of Turf Producers Australia, and presidents of other industry associations, with all the information that it had available regarding the perilous state of the water supply situation. The Corporation was also very aware of data on the estimated numbers employed in the garden industry and the value of the industry to the Western Australia economy.

Numbers Employed in Garden Industry	
Sector	Employees
Turf	4,800
Reticulation	3,000
Garden Centres	2,900
Fertilisers	500
Miscellaneous (mulch, bores, etc)	1,800
Total	13,000
Total annual turn over of \$1.4 Billion	

A total sprinkler ban would severely impact on many individual families and WA’s economy as a whole.

The Garden Industry Reference Group determined to do all within its power to work with the Corporation to avoid a total sprinkler ban. The Corporation calculated that it was necessary to reduce annual water consumption by 45 GL to avoid a total sprinkler ban. The challenge was how to do it.

WHAT RESEARCH HAD BEEN UNDERTAKEN?

The Corporation had previously worked with the turf industry and the University of Western Australia to conduct trials into appropriate turf types and watering regimes relevant to soil and climatic conditions. A Turf Industry Steering Committee had been established to oversee the research; I was the chair of the committee and Ray Moir was a member.

The research indicated that the optimum watering for lawns in the heat of summer was three times a week, however, the research also showed that provided the lawn was properly established and maintained it could grow adequately on two waterings a week, each of 10 mm. This information formed the basis for the imposition of the water restriction regime imposed on Perth and other towns on the IWSS

WHAT WAS THE PLAN?

The Water Corporation, after input from the garden industry and other stakeholders, decided that restrictions limiting watering with scheme water to two days a week would be imposed. This decision was taken after assurances from the turf and other industries that the regime would be fully supported. The threat of a total sprinkler ban was hanging over everyone.

Whilst these actions were being formulated the Corporation was working with the Turf Industry to develop a process to exempt from water restrictions households installing new lawns. This process was given carefully consideration. The exemption from restrictions needed to be significant enough to allow the turf to establish but not so extensive as to alienate the rest of the community who were only allowed to water on two days.

At the monthly meeting of the Garden Industry Reference Group information regarding the Corporation's proposed planned communications campaign was detailed, input was sought and suggestions integrated.

HOW DID WE COMMUNICATE?

Key messages were delivered through public presentations at nurseries (which were jointly promoted by the Garden industry and the Corporation), Home and Garden shows and by sponsoring segments on TV garden shows.

Point of sale material was developed and distributed to turf growers, retail outlets, etc. and the Corporation sponsored trade and consumer events which supported these industries.

These presentations were designed to:

- inform the garden enthusiast of the facts as they related to the water issue;
- inform the community in general of the plans in place for future water source development; and importantly
- to instil confidence in this section of the community that it was possible to maintain an attractive garden both now and into the future.

The Corporation also recognised that Garden Industry businesses and their staff would be in contact with our customers. Presentations were made to association executives and their members. It was very much in the Corporation's interest to ensure that they were in possession of some of

the high level facts about water source planning like the merits or otherwise of a Kimberley pipeline, the extreme winter event in 2001 and the number of source options we have in this State. Technical briefings were delivered on request to staff at individual businesses.

COMMERCIAL/INDUSTRY SECTOR

The restrictions regime that was put in place clearly targeted garden use but also extended to discretionary use in industry.

There was much public comment about the need for industry to show restraint in the face of the restrictions. The Corporation worked closely with industries most under scrutiny from the public like the building industry, the used car industry and the construction industry.

Work with the Housing Industry Association resulted in a publicity campaign to reduce water wastage on new housing construction sites. The Corporation also encouraged the Motor Trades Association to develop and implement an industry code of practice on water use in car yards.

With a high level of public scrutiny on industry use of water, the Corporation also responded to many requests for specific briefings from industry designed to more fully inform them of the facts of the current situation and the Corporation's plans for the future. The heavy construction industries, particularly road and subdivision work, were constantly targeted by the community for their poor conservation practices.

CONCLUSION

How do we assess the effectiveness of the campaign?

Satisfying the primary objective, which was to save 45 GL of water each year, is the obvious measure of success. However, there are a number of less obvious indicators that are also powerful measures.

- When compared to the Eastern States WA has a turf/garden industry that is still intact and operating viably.
- A turf/garden industry that recognises the need to re-focus their businesses.
- A high degree of compliance by the community with the restriction regime.
- A community that still supports restrictions, in the fifth summer support for restrictions is running at 93%.

Turf can be marketed in times of water restriction so long as there is a positive working relationship between the turf industry and the water utility. The turf industry must aggressively support the utility by promoting proper turf selection, installation and maintenance. Turf suppliers

must give good advice to their customers regarding water restrictions and how the exemption period from restrictions works.

The water utility must become involved in turf research that considers the water efficiency of turf, turf genotypes suited to local conditions and turf watering regimes. The water utility must support the turf industry by making available to the general public appropriate booklets/pamphlets etc. on water efficient gardening. Finally and most importantly, the utility must support the turf industry by having open channels of communication and responding to concerns in a positive manner.

John Brennan, Water Efficiency Planner, Water Corporation,

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March 2006

Optimising Water and Nutrient Management for Turf on Sandy Soils

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Introduction

Turf managers and society are seeking more efficient systems for delivering consistent and high quality turf surfaces that do not impact on ground- or surface-waters. This is particularly challenging for turf management on sandy soils, as these soils are conducive to leaching. The University of Western Australia (UWA), in partnership with Horticulture Australia Ltd and industry groups, have established a research program to evaluate turf performance, as well as the fates of applied water and nutrients, under various management regimes. Improved practices in fertiliser agronomy and irrigation scheduling have been suggested as approaches to reduce the environmental impacts of turf culture (Beard, 1973; Snyder *et al.*, 1984). The overall objective of the UWA research program is to assist industry in the development of management practices that maximise turf quality, while minimising environmental impacts such as water consumption and nutrient leaching.

The program has been developed, and managed, in consultation with industry groups, via our 'UWA Turf Industries Research Steering Committee'. Priority areas for research on turf were identified by the committee. This paper describes the research conducted by UWA on water and nutrient management in turf.

The UWA Turf Research Facility

The UWA Turf Research Facility was established in 1997 at the UWA Research Park in Shenton Park (approximately 8 km west of Perth's CBD). Industry members played a leading role in the establishment of the facility which includes: (i) an innovative variable-speed lateral boom irrigator, (ii) soil moisture monitoring equipment, (iii) a weather station, (iv) a series of lysimeters, and (v) access to analytical laboratories at the UWA Crawley Campus.

The variable-speed lateral boom irrigator pumps water from a central channel onto the experimental plots. The irrigator travels along a 72 m rail, and has an overall width of 43 m, which consists of two 20 m boom sections either side of 3 x 3 m chassis. The chassis includes a 4 m high mast with catenaries to support and stabilise the boom arms 600 mm above the ground. A constant speed diesel motor directly coupled to irrigation and hydraulic pumps powers the self-propelled irrigator. A microprocessor unit has the ability to accelerate or decelerate the irrigator, and to monitor engine functions, water flows and pressures, and the position of the irrigator. The boom arms feed into four separate 9.5 m sections; each boom section is individually controlled by a solenoid valve actuated at selected times by the microprocessor unit.

Project 1: Water use by a diverse range of turf genotypes

The objective was to determine irrigation requirements, water use rates, and turf recovery following a period of low water availability, for 11 genotypes (9 ‘warm season’ and 2 ‘cool season’ grasses) grown during summer in Perth. Plots (3 x 3 m) were planted mid-January 1997 in 15 complete blocks. Each block contained the 11 genotypes and one plot of bare sand. The irrigation trials were conducted over three summers. Each summer, five irrigation treatments (each replicated three times) were imposed.

Major findings were:

- The minimum daily irrigation required to maintain turf growth and colour ranged from 50-60% pan evaporation (Epan) for the nine ‘warm season’ (i.e. C₄) turf genotypes, to 80-100% for the two ‘cool season’ (i.e. C₃) turf genotypes. The lower irrigation requirements of warm season grasses was associated with lower rates of evapotranspiration and deeper root systems in these genotypes, compared with the cool season grasses. For example, the rate of water use by ryegrass (cool season) was 1.7 times that of Wintergreen couch (warm season) (Table 1).
- Differences in water use rates and irrigation requirements among the warm season genotypes were relatively small. The maximum difference in mean water use rate among the warm season genotypes tested was 8% of Epan, and although the results were reproducible the differences were not statistically significant (Table 1).
- Amalgamation of daily irrigations of 50% Epan into larger, less frequent, applications, did not result in significant improvements in turf performance. In fact, for four genotypes (*Zoysia*, *Buchloe*, Saltene and Kikuyu) colour was reduced when irrigations were extended to every 3rd day.
- The current recommendation from the WA Water Corporation for homeowners to apply a “10 mm standard drink every second day during the summer for established lawns in Perth” was confirmed as valid. All warm season genotypes tested, except *Buchloe*, were maintained in a satisfactory condition when watered at the equivalent of 10 mm every 2nd day, although colour declined by the end of summer in several genotypes (Table 2). Less frequent irrigations (i.e. every 3rd day) only maintained turf for several weeks.
- The abilities of the nine warm season genotypes to recover following periods of low water availability were vastly superior to those of the two cool season genotypes.

The results demonstrate the opportunity for water conservation by using warm season (i.e. C₄), rather than cool season (i.e. C₃), turf genotypes in regions with hot dry summers typical of a Mediterranean-type climate. The data on turf evapotranspiration rates, and responses of turf growth, colour and physiology to declining irrigation, provide the baseline information required by turf managers to ‘benchmark’ irrigation scheduling. When considering the results of this study, it should be noted that the plots were not exposed to wear, a factor that can increase turf water requirements (Carrow & Petrovic, 1992). For additional information on this study see Colmer & Short (2001).

Table 1. Evapotranspiration (ET) rates for various turf genotypes. Values expressed as % of pan evaporation (Epan). Values given are means of 3 replicates \pm standard errors. Different letters in the same column indicate significant differences at the 5% level.

Evapotranspiration (% of Pan Evaporation)		
Genotype	Days with 5–8 mm of Epan	Days with 8–11 mm of
Wintergreen	59.8 (\pm 2.1) ^a	51.9 (\pm 1.6) ^a

Saltene	63.9 (\pm 2.4) ^a	53.8 (\pm 1.5) ^a
Buffalo	67.8 (\pm 2.4) ^a	55.4 (\pm 1.6) ^a
Kikuyu	65.8 (\pm 2.8) ^a	55.4 (\pm 1.0) ^a
Zoysia	66.5 (\pm 3.2) ^a	52.3 (\pm 1.9) ^a
Tall fescue	95.5 (\pm 4.7) ^b	87.7 (\pm 3.0) ^b
Ryegrass	102.1 (\pm 4.4) ^b	90.0 (\pm 5.8) ^b
Bare soil	51.0 (\pm 4.6) ^c	33.6 (\pm 3.3) ^c

Table 2. Colour retention as % of controls (irrigated at 100% replacement of Epan) for nine warm season turf genotypes in field plots irrigated at 50% of Epan summed and applied every 2nd day, or 33% of Epan summed and applied every 3rd day. Values given are the means \pm standard errors.

Genotype ^A	Colour Retention (% of Controls)	
	Irrigated every 2 nd day	Irrigated every 3 rd day
Wintergreen	94 \pm 3	93 \pm 4
Windsor green	87 \pm 7	67 \pm 10
CT-2	77 \pm 2	56 \pm 14
Santa Ana	97 \pm 4	78 \pm 4
Saltene	84 \pm 6	24 \pm 15
Buffalo	83 \pm 5	60 \pm 7
Kikuyu	50 \pm 10	24 \pm 8
<i>Buchloe</i>	34 \pm 12	13 \pm 14
<i>Zoysia</i>	76 \pm 5	42 \pm 10

^AThe two cool season genotypes died when irrigated every 2nd or 3rd day.

Project 2: Fly ash amendment of sandy soils to improve water and nutrient use

Fly ash is a fine residue captured from the flue exhausts when coal is burnt in power stations. Fly ash is comprised primarily of fine sand- and silt-sized particles, and if applied at sufficient rates has the potential to increase the water holding capacity of sandy soils (Adriano *et al.*, 1980). Fly ash may also improve the nutritional status of sandy soils by increasing cation exchange capacity, and by providing some essential nutrients (Summers *et al.*, 1998). Fly ash properties do vary depending upon the source, consequently local trials of a particular ash source in combination with the target soil(s) are required before recommending fly ash as a soil amendment. The objectives were to determine if fly ash amendment improves water and nutrient retention in sandy soils, and to assess potential impacts on the environment of amending soils with fly ash.

Major findings for fly ash from Kwinana Power Station, WA:

- Incorporation of as little as 5% (by weight) of fly ash improved in water holding capacity in sandy soils. Water holding capacity (and plant available water) increased progressively with larger additions of fly ash to the soil (Figure 1); but at 20% (by weight) fly ash, water infiltration rates became slow.

- In field plots, fly ash improved water holding capacity, provided a source of plant available phosphorus, and root growth was enhanced in the fly ash amended zone of the soil.
- Incorporating fly ash decreased nitrate and phosphorus leaching from soils in the absence of turf. However, in the presence of turf, nutrient leaching decreased by one order of magnitude and so there was no significant effect of fly ash on nutrient leaching from under turf in field plots.
- Possible release of trace elements was evaluated using the Toxicity Characteristic Leaching Procedure (Testa, 1997); values obtained for all 14 trace elements tested were well below regulatory guidelines.

For additional information on this project see Pathan *et al.* (2001; 2002; 2003a; 2003b; 2004).

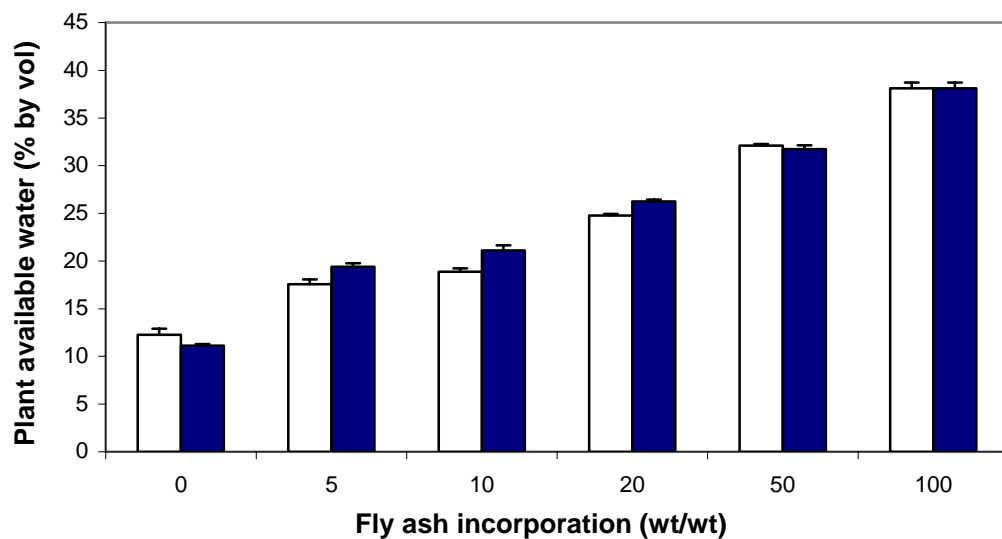


Figure 1. Effect of rate of Kwinana fly ash incorporation on plant available water in soil:fly ash mixtures. Symbols: Open columns = Spearwood sand, Closed columns = Bassendean sand. Values given are means of 3 replicates \pm standard errors

Project 3: Use of a soil moisture sensor to control irrigation of turf

Soil moisture sensing control of irrigation offers a means of preventing over irrigation and also to reduce nutrient leaching (Morton *et al.*, 1988; Snyder *et al.*, 1984). Our study evaluated water application rates, leaching and turf quality for plots under a soil moisture sensor-controlled irrigation system, as compared with ‘current best practice’ for home lawns. Current best practice of ‘conventional’ irrigation was as recommended by the State’s water supplier (The Waterwise Gardening Guide www.watercorporation.com.au). The experimental design was two irrigation regimes by three replicates; providing a total of six plots in a completely randomised design. Plots were planted with turf sod on 9 January 2002. The corner of each plot contained a quarter-circle spray head sprinkler. A soil moisture sensor was installed in the center of three of the plots, at a depth of 50 mm.

Major findings were:

- The cumulative volume of water applied during summer to the turf plots with the soil moisture sensor-control system for irrigation was 25% less than that applied to plots watered according to ‘current best practices’ (Figure 2).

- During 154 days over summer and autumn, ~4% of the applied water drained from lysimeters in sensor-controlled plots, while ~16% drained from lysimeters in plots with ‘current best practice’ irrigation scheduling.
- Acceptable turf growth and colour were maintained under both treatments.

Addition information is available in Pathan *et al.* (2003c).

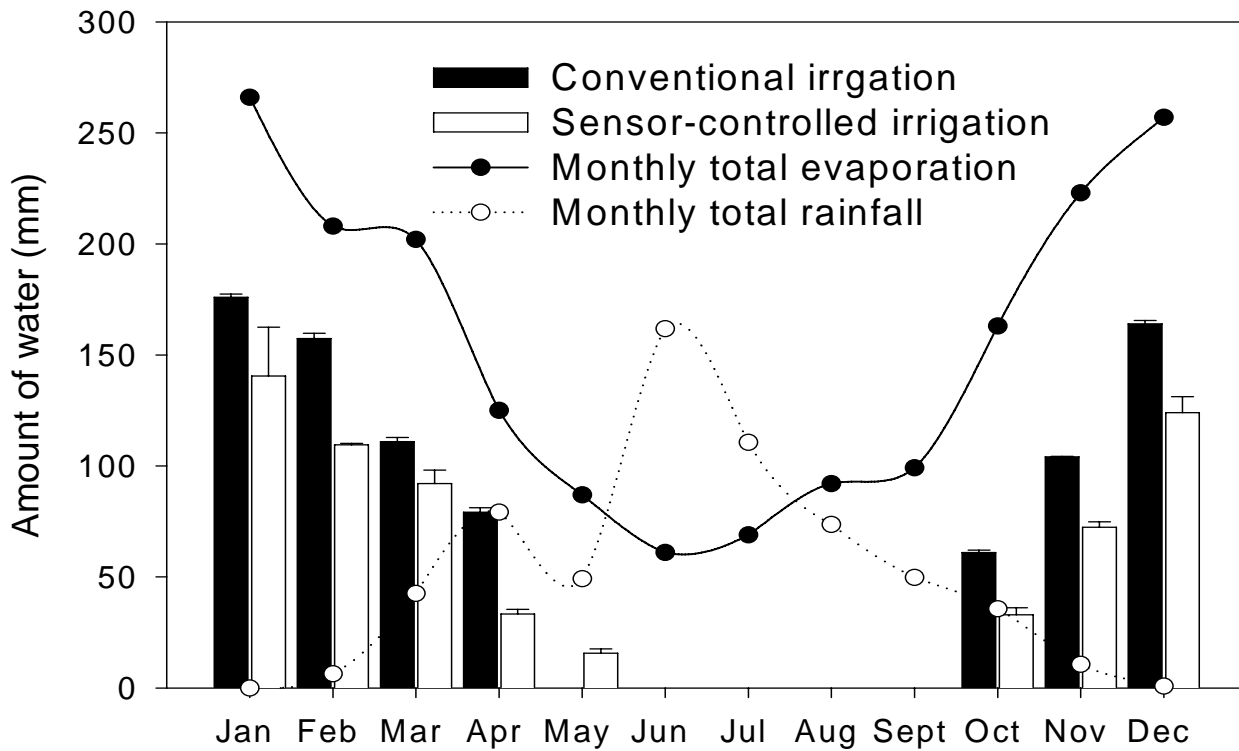


Figure 2. A comparison of the amounts of water applied to turf on a monthly basis for a soil moisture sensor-controlled system and ‘current best practice’ (conventional) for irrigation scheduling. Monthly totals for evaporation and rainfall during the study (April 2002 to March 2003) were from an Automatic Weather Station. Data on water applied are means of 3 replicates \pm standard errors (error bars not visible when smaller than the size of symbols).

Project 4: Development of nutrient management systems for the WA Turf Industry

Matching fertiliser application rates to turf demand, and choosing irrigation regimes that maintain soil water in the rooting zone, is important for minimising nutrient leaching from turf and other horticultural systems (Barton & Colmer, 2006). In October 2001, we commenced our field trial to investigate the interaction between fertiliser and irrigation regimes on the growth and quality of turf (Wintergreen couch) in a sod production system, as well as the potential for nitrogen and phosphorus leaching.

The study included 4 fertiliser types: conventional (soluble), control release, pelletised poultry manure and pelletised biosolids, 3 application rates (100, 200 and 300 kg N ha⁻¹ per “crop”), 2 irrigation rates (70% and 140% daily replacement of pan evaporation) and 3 replicates, in a randomised split-plot design. Treatments were applied to 4 consecutive crops over 2 years.

Main findings were:

- Turf growth and quality varied depending upon the irrigation and fertiliser regime. Applying conventional (i.e. water-soluble) or control-release fertilisers promoted better growth and colour, compared with pelletised poultry manure or pelletised biosolids. Nitrogen uptake after four crops averaged 497 kg N ha⁻¹ for the conventional fertiliser, 402 kg N ha⁻¹ for the control-release, 188 kg N ha⁻¹ for the pelletised poultry and 237 kg N ha⁻¹ for the pelletised biosolids (Figure 3).
- Increasing the irrigation rate from 70% to 140% replacement of pan evaporation did not improve turf growth or colour, but was detrimental to growth and N uptake for the conventional fertiliser treatment during the first crop when the turf was establishing.
- Under the lower irrigation regime, inorganic N fertilisers applied at 200–300 kg N ha⁻¹ per crop were adequate for production of couch grass.
- The amount of N leached varied depending upon the irrigation and fertiliser regime, and ranged from 33–167 kg N ha⁻¹ after 22 months. Irrigation rate effected N leaching more than fertiliser treatment, and increasing the irrigation rate from 70% to 140% replacement of daily pan evaporation increased N leaching for all fertiliser types, and by up to four times. At the high irrigation rate, N leaching was greater for the pelletised biosolids than the control-release; while at the low irrigation rate, N leaching did not vary between fertiliser types.
- Nitrogen leaching losses were not evenly distributed throughout the study, with 46–76% of losses occurring from the 140% replacement of pan evaporation irrigation treatments during the first 16 weeks of the study when the turf was establishing.

The results show that optimising irrigation regimes will not only increase turf growth, but also minimise nitrogen leaching. For additional information see Barton & Colmer (2004) and Barton *et al.* (2006a; 2006b).

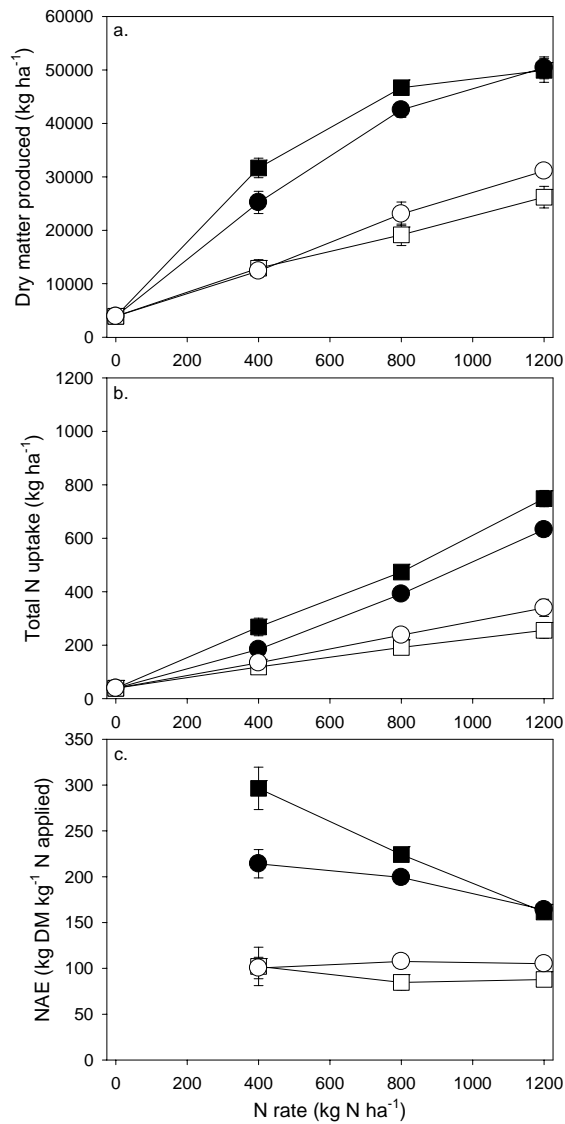


Figure 3. (a) Influence of total N supply after 4 crops and fertiliser type on dry matter (clippings + shoot fraction in turf rolls) measured from turf plots, (b) turf N uptake into shoots measured from lysimeters and (c) NAE (kg DM kg⁻¹ N applied) measured from turf plots for all four crops. Means (and standard errors) of six values, as values for high and low irrigation treatments were pooled. Symbols: ■ Water-soluble, ● Control-release, □ Pelletised poultry manure, ○ Pelletised biosolids.

Current projects (2005 – onwards)

Three projects on turf are currently in progress at UWA. These are:

- Optimising nitrogen fertiliser and mat and thatch control practices for Kikuyu turfgrass (2004-08, funded by Horticulture Australia Ltd & Industry Partners).
- Adaptation and management of buffalograss cultivars for shade and water conservation (2006-08, funded by Horticulture Australia Ltd & Industry Partners).
- Understanding salt and water dynamics to enhance the quality of turfgrasses irrigated with saline water in a Mediterranean environment: an evaluation of four species (2006-09, funded by ARC Linkage, Shire of Wagin & DAWA).

Kikuyu turfgrass is grown extensively throughout Australia, yet its management is not fully understood. Our research aims to assess if optimising nitrogen fertiliser management maximises turf quality while minimising nitrogen leaching and the accumulation of mat and thatch. Furthermore, the research will determine if mat and thatch accumulation influence Kikuyu water use. Kikuyu is well known for accumulating mat and thatch, so the project will also compare non-destructive and destructive methods for controlling and managing mat and thatch.

Soft-leaf buffalo is gaining in popularity in Australia. The UWA, in partnership with QDPI & F (Dr Don Loch), is evaluating water use and drought tolerance of a range of genotypes. Performance on calcareous soils common in coastal regions of Western Australia will also be tested. In Queensland, plant morphology and development, the influence of fertiliser management and mowing frequency on growth and quality, wear, shade tolerance, and herbicide tolerance, will be evaluated. Finally, a range of sites around Australia have been selected to evaluate the adaptation of various genotypes to a diverse range of climatic and soil conditions.

Many towns in rural Australia are threatened by rising saline groundwater. This water might be used to irrigate salt-tolerant grasses for turf or fodder. Our research will elucidate the physiology of salt-tolerant grasses managed as turf, as well as fates of salts and water, when irrigated with saline groundwater. The research will involve field, glasshouse and laboratory experiments in a comparative study of four species. The field plots will be located within the town of Wagin, in the wheat belt of Western Australia. The research is in collaboration with WADA (Drs. Ed Barrett-Lennard and Mark Pridham – Rural Towns Liquid Assets) and the Shire of Wagin. The outcomes will contribute to development of best management practices for use of halophytic turfgrasses irrigated with saline water, and ultimately to National priorities dealing with salinity management and protection of water resources.

Conclusions

By working together, industry groups and researchers can promote the development and use of best management practices. New knowledge is being rapidly incorporated into industry practice, benefiting the environment and profitability. Irrigation practices that maintain soil water in the rooting zone not only conserves water, but also minimises the risk of nutrient leaching. Furthermore, choosing water efficient turf types, and in some situations (i.e. sandy soils) using amendments that improve soil water holding capacity, will also conserve water, and may also further decrease the risk of nutrient leaching (Barton & Colmer, 2006). Turf can be managed with minimal impacts on the environment.

Acknowledgements

We thank the members of the UWA 'Turf Industries Research Steering Committee' for their valuable advice and enthusiastic support during this project.

Horticulture Australia Ltd, in collaboration with industry partners, have funded turf research at UWA (HAL Projects TU96002, TU00007, TU02006, TU4001, TU4008).

Industry partners have included: Water Corporation, Waters & Rivers Commission, WA Turf Growers Association, Organic 2000, MicroControl Engineering (RainMAN), Western Power Corporation, Ash Development Association of Australia, Scotts Australia, CRESCO/CSBP, Baileys Fertilisers, Golf Course Superintendents Association of WA, WA Ground Managers Association, Botanic Gardens and Parks Authority, WA Department of Education and Training, Turfgrass Association of Australia (WA Branch), Lawn Doctor, Turf Master, City of Armadale, City of Bayswater, City of Belmont, Town of Cambridge, City of Canning, City of Cockburn, City of Gosnells, Town of Kwinana, City of Melville, City of Nedlands, City of Rockingham, City of Perth, City of South Perth, City of Stirling, City of Subiaco, City of Swan, Cottesloe Golf Club, Gosnells Golf Club, Hartfield Country Club, Mosman Park Golf Course, Royal Fremantle Golf Club, Royal Perth Golf Course, West Australian Golf Course, Brisbane City Council, Buchanan Turf Pty Ltd, Delfin Lend Lease, H&T Whiting Turfgrass Developer LLC, Matilda Trading Pty Ltd, Sod Solutions, Richmond Turf, TurfCo Pty Ltd, Turf Force, Palmetto WA Group, Sir Walter WA Group.

In-kind contributions from: WA Turf Growers Association, Golf Course Superintendents Association of WA, Sentek Environmental Innovations, City of Stirling, City of Melville, ALROH Turf Machinery, Nelson Australia, Total Eden Irrigation, Turbo Mulch, Greenacres Turf Farm, Casuarina Earthmoving & Transport, Murdoch Challenger TAFE, Dr. Baden Clegg Pty Ltd, Wembley Golf Course, QDPI&F, WADA.

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UWA Turf Research Programme

www.agric.uwa.edu.au/turfresearch/index.htm

Our purpose is to work in partnership with the Australian Turf Industry to develop science-based best management practices for turf, ultimately contributing to the sustainable development of the Australian Turf Industry and a healthy environment for all Australians

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 Programme aims to develop science-based best management practices for turf, through an understanding of soil and turfgrass processes.



Preparing turf plots at the UWA Turf Research Facility. Experiments are conducted using management techniques relevant to the Turf Industry

The research programme has been developed, and managed, in consultation with industry groups. A 'UWA Turf Industries Research Steering Committee' was established in 1995, bringing together stakeholders from the WA Turf Industry, Government, and research arenas. The objectives of the steering committee are to:

- Select projects that have relevant and achievable goals, are completed within budget and produce knowledge that is disseminated to stakeholders.
- Raise the profile of the research group so that it is recognised internationally for excellence in turf research.
- Secure adequate and on-going funding from stakeholders.

The close involvement of industry groups has enhanced our research capacity and facilitated communication between research providers and stakeholder groups.

Research

The UWA Turf Research Programme has been very successful at providing new and relevant information to industry. The programme has investigated:

- Water-use and drought tolerance of different turf types commonly grown in Australia. The WA Water Corporation now bases its recommendations on these findings.
- The use of fly ash as a soil amendment to improve water and nutrient retention in sandy soils.
- Evaluation of a soil moisture sensor for reducing water use and nutrient leaching in turf. The WA Water Corporation is investigating the use of soil moisture sensors in domestic gardens.
- Irrigation and fertiliser management strategies that maximise turf (sod) production and minimise nitrogen leaching. Findings have been incorporated in industry training manuals, such as *TurfSustain*.

A web-site providing details on past and present projects, and listing publications arising from the work, has been established:
<http://www.agric.uwa.edu.au/turfresearch/index.htm>



Shahab Pathan, a PhD graduate, incorporating fly ash into turf plots. Investing in postgraduate student research ensures the availability of expert research personnel for the Australian Turf Industry



Golf course apprentices assisting with establishment of experimental plots

Key Stakeholders

- *Australian Turf Industry* – it produces, distributes, installs, maintains, and provides products and advice to the end users of turf. This also includes
 - Industry associations and bodies *e.g.* Horticulture Australia Ltd, WA Turf Growers Association, Golf Course Superintendents Association, Parks & Leisure Australia, Turf Producers Australia, Turf and Landscape Industry Association Inc, Irrigation Association of Australia, Racing & Gaming Industry, Turf Grass Association of Australia.
 - Companies that provide products and services to turf growers and managers *e.g.* fertiliser companies.
 - Companies with potential synergies, such as the use of by-products (fly ash) *e.g.* Western Power Corporation, Ash Development Association of Australia.
- *Bulk end users e.g.* golf courses, ovals, parks.
- *Individual end users e.g.* home owners.
- *Government agencies* – this includes agencies that influence users *e.g.* Departments of Agriculture/Natural Resource Management, Departments of Environment, State and Local Governments.
- *Suppliers and regulators of water resources e.g.* state water authorities and environmental protection agencies.
- *Education and research providers e.g.* TAFE, Universities, CSIRO, WADA.

Communicating with Industry

Communication of our results and feedback from the Turf Industry is important to the success of our programme. In collaboration with our industry partners, we have developed a communication strategy comprising: regular publications in industry journals, participation in industry workshops and national conferences, field days and research site visits, a bi-annual seminar at UWA and a website <http://www.agric.uwa.edu.au/turfresearch/index.htm>



Findings from the UWA Turf Research Programme have been incorporated into 'TurfSustain', a manual for turfgrass managers

Contact Us

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***The UWA Turf Research Programme is
at the School of Plant Biology, Faculty
of Natural and Agricultural Sciences,
The University of Western Australia.***

***We thank HAL and our Industry
Partners for supporting turf research
at UWA.***

Projects Managed by the UWA Turf Industries Research Steering Committee

Title of Project	Dates	Funding Partners	Major Industry Outputs*
Reducing water use by turf grasses in a Mediterranean environment: evaluation of diverse species	1997 to 2001	HAL (HRDC Project TU96002) Water Corporation, Waters & Rivers, WA TGA, Organic 2000 MicroControl Engineering, WA GCSA & WA GMA	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 paper submitted to a scientific journal
Fly ash amendments to improve water and nutrient use in turf systems on sandy soils	1999 to 2002	Western Power, Ash Development Association of Australia	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
Development of nutrient management systems for the WA turf industry	2001 to 2004	HAL (Project TU00007) Water Corporation, Waters & Rivers, WATGA, Organic 2000 Scotts Australia, CSBP/Cresco, MicroControl Engineering, WA GCSA, City of Stirling, City of Nedlands	5 publications in industry journals Annual field days TV, radio, newspaper interviews Presentations at national meetings Final report to HAL 1 invited review published in an international scientific journal Invited speaker at International Agronomy Conference 2 papers published in scientific journals
Evaluation of a soil moisture sensor control system for improved water use efficiency in turf	2002	Holman Industries	Final report to Holman Industries Presentations to WA industry
Evaluation of a soil moisture sensor to reduce water use and nutrient leaching in turf	2003	HAL (Project TU 02006) Holman Industries	TV and newspaper articles Final report to HAL 1 paper submitted to an international scientific journal

Kikuyu Research Project	2005 to 2008	HAL (Project TU4001) Baileys Fertilisers, CSBP Ltd, Lawn Doctor, Micro Control Engineering, Organic 2000, PLA (representing a consortium of Local Government & Government Authorities), TGGA, WATGA, TurfMaster, WAGCSA, Water Corporation	1 publication in industry journal 6 newsletters per year Annual field days
Adaptation and management of buffalograss cultivars for water conservation	2006 to 2008	UWA component, HAL Project TU04008 (with QDPI&F) WATGA, WA Palmetto Group WA Sir Walter Group, Brisbane CC, Buchanan Turf, H&T Whiting, Lend Lease, Matilda Trading, Richmond Turf, Sod Solutions, Turf Force, TurfCo	Turf project launch/field day
Irrigation of turf with saline water	2006 to 2009	ARC Linkage Shire of Wagin DAWA	To commence in June, 2006
Biannual UWA Turf Seminar Days 'Turf Management: Present & Future'	2000 2002 2004	Water Corporation Self-funding (Registration fees)	Communication with stakeholders and extension of results Abstract booklets

* Practical outputs for industry include data on turf water use and nutrient budgets for several fertiliser types and rates, against which industry can benchmark fertiliser management to optimise turf quality, and minimise environmental impacts.

Skills Pathways

Developing and using skills pathways.

Opportunities:

Some industries have been slow to react to the “new” training environment in Australia – others are actively competing for the resources made available for skilling and retraining workforces and business operators. The primary industries sector is in the first category, despite the fact that it has a high priority on the publicly resourced skills agenda.

People gain skills throughout their careers through a wide range of opportunities:

1. **Day to day experience and learning from others on an incidental basis.**
2. **Actively seeking and using the experience of others:**

2.1 Off the rack

Participating in set training programs. Generally and understandably not a high level of participation from farming groups.

2.2 Made to fit

- Using consultants one-on-one,
- Group work,
- Workshops,
- Conferencing,
- Seminars,
- Short courses,
- Project-based skills development,
- Through levy systems.

2.3 Combinations of some or all of the above.

Funding opportunities:

- Subsidised programs:
 - Horticulture Australia Ltd,

- FarmBis,
 - Departments of Agriculture,
 - Universities,
 - Vocational Education and Training (VET) eg TAFE,
 - Regional development,
 - Various other Commonwealth and State funding opportunities.
- Combinations of any of the above.
- Full cost programs.

VET programs.

- A program can involve:
 1. An individual
 2. A business organisation as a whole
 3. Groups of people with similar skills requirements
 4. A group of businesses with common interests eg Environmental Management Systems activities
 5. An industry association working in partnership with a VET provider.
- From high level subsidy to no public resource input, depending on program and participants,
- Can be assessable to non-assessable, depending on program and participants,
- Can be combinations of assessable, non-assessable, subsidised and unsubsidised segments,
- Programs, whether individual project based, short course, workshop, traineeship, apprenticeship, part-time and full-time, are now most often based on nationally recognised industry training packages, eg Amenity Horticulture Training Package, Rural Production Training Package, Conservation and Land Management Training Package.
- Each of these Training Package is reviewed by industry skills councils in the case of turf growers by the AgriFood Skills Council and changed every five years.
- Each Package has a number of qualification streams.
- Each qualification stream has six levels,
 1. Certificate I Basic skills, no problem solving.
 2. Certificate II Higher level of industry specific knowledge but still requires regular supervision
 3. Certificate III (Trade certificate). Trade Skills level.
 4. Certificate IV (Advanced certificate). Higher level of technical skill and some process management.
 5. Diploma. Able to manage procedures and other people
 6. Advanced Diploma. Able to manage a broad range of business operations.

- Each Training Package consists of many units. Each unit represents a skill at a certain level ie a Level 3 unit represents a skill at the trade level. To see some of these units please refer to information CD *WA Horticulture and Environmental Science Skills Centre*. There are many more units than on the disk, not only in these Training Packages but in others that you may be equally interested in eg the business services training package.
- **If you are interested in particular skills, either personally or on a group, association or industry basis you can negotiate to do one unit or several, or enough to gain a whole qualification.**
- **Gaining formal recognition of skills.** Many people want the skills without gaining a qualification. For many reasons others want formal recognition that they have gained some or all of the skills required for a qualification (gaining employment, insurance, contracts etc). This is achieved through a number of avenues:
 1. Skills recognition (skills learnt by doing on the job),
 2. Traineeships (existing worker and new job entrant),
 3. Apprenticeships,
 4. Part-time, short course, workshops,
 5. Project based and other self paced skills development.

How do you negotiate with your VET provider?

The same way that you do with any other allied business ie give us a call and discuss your skills needs and a product can be developed within the range of funding guidelines.

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