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AUSTRALIAN Turfgrass MANAGEMENT

VOLUME 9.5 SEPT-OCT 2007

Water management
Glenelg ASR scheme
The Sands desalination
AGIC water use survey

2007 AGCSA Award Winners
Reg McLaren
Darren Wilson
Stuart Moore
Peter Beach

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Bentgrass propagation and salinity tolerance
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Inside Augusta National
An Aussie's odyssey

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Australian Turfgrass Management
Published by:
Australian Golf Course Superintendents' Association
ABN 96 053 205 888

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Printed By
Impact Printing
69-79 Fallon Street
Brunswick, VIC 3056

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Augusta National
The 13th at Augusta National Golf Club in Georgia, US. Home to the US Masters every April, for the past two years it was also the home to young Australian greenkeeper Daniel Cook.
Photo by: visionsingolf.


PHOTO BY visionsingolf

AGIC unveils industry water document 40

In September 2006 the Australian Golf Industry Council (AGIC) was formed to represent the golf industry on important issues such as the current challenges surrounding water use and management. In its first official undertaking, the council has investigated golf course water use.

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AGCSATech Update 34

John Neylan and Andrew Peart provide a comprehensive update on AGCSATech's HAL-funded bentgrass and *Poa annua* trials currently being conducted at various locations around Australia.

IN EVERY EDITION

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mastering augusta

South African golfing great Gary Player once quipped, "If there is a golf course in heaven, I hope it's like Augusta National. I just don't want an early tee time."

The Bobby Jones-Alister MacKenzie designed beauty, nestled in the US city of Augusta on the Georgia-South Carolina border, has set a benchmark when it comes to golf course presentation and since opening in the 1930s it has engendered a love-hate relationship with superintendents worldwide.

While it is admired and envied for its agronomic excellence it has also, through the advent of televised tournaments, cultivated the 'Augusta Syndrome' and there wouldn't be a superintendent out there who hasn't fielded queries from armchair agronomists at their club as to why their course can't be presented in a similar fashion.

While Augusta National is the exception not the rule when it comes to golf course maintenance, it is hard not admire what goes on behind the gates of this exclusive and very private golfing facility. Indeed, you only have to read the regular profiles in the ATM 'Offshoot' supplement to see that Augusta National is the overseas course most Australian superintendents and assistant superintendents would sell a kidney to get to see.

While for some a trip to Augusta National may eventuate during the course of their professional career, very rarely does a chance come along to actually become part of the crew entrusted with preparing the course, which plays host to the US Masters in the first week of every April. For one Australian, however, such a break was forthcoming and over the past two years he rose to be part of the assistant team under Augusta National superintendent Brad Owen.

His name is Daniel Cook, a 28-year-old who started his career as a groundsman at Mona Vale Golf Club. Serving his apprenticeship at Monash Country Club, it was his involvement in the Ohio State Program which ultimately led him on the road to Augusta National. The contacts he forged while in the US paved the way for him to secure what is without a doubt one of the rarest opportunities this industry could provide.

During his time at Augusta National Cook became the first Australian to become part of the management inner sanctum and for the 2007 US Masters was entrusted with managing the back nine greens leading up to and during the tournament. Now there's something to have on your turf management CV!

Cook recently returned home to the northern beaches of Sydney after being appointed superintendent at Elanora Country Club, but before doing so took the time to write about his experiences at Augusta National. Unfortunately he can't divulge certain aspects of Augusta's agronomic operations – part of being employed there entailed Cook signing a 10-year confidentiality agreement – but I am sure you will agree his story, which acts as our lead article in this edition, and the journey he took to get there is nonetheless fascinating. The only question the article raises is why on earth he decided to leave!

Cook's unique glimpse inside Augusta National kicks off an edition which also examines water management issues at a number of different levels. We look at how two golf clubs – Glenelg and The Sands, Torquay – are responding to the challenge of Australia's water shortage crisis, as well as release the Australian Golf Industry Council's water use survey which it hopes will aid the industry in its quest to be seen as a leader and innovator in the area of water management.

Not surprisingly water management was again a hot topic at the recent 23rd Australian Turfgrass Conference and this edition reviews the week that was in Cairns, including profiling the four 2007 AGCSA Award winners – Reg McLaren, Darren Wilson, Stuart Moore and Peter Beach.

Enjoy the read and here's hoping for a wet spring!

Brett Robinson
Editor

JOHN NEYLAN AND SCOTT PETERSEN, AGCSA JOINT GENERAL MANAGERS

The AGCSA has just completed another successful Australian Turfgrass Conference with the education content receiving a 5-star rating. Likewise the venue and trade exhibition received extremely favourable feedback and on reflection the Cairns gathering proved successful at all levels.

The hidden benefit of being involved with such a week is the tremendous opportunity for networking. If you break it down you can identify some of the networks being developed. These include super to super, trade to supers, presenters to presenters, presenters to trade, supers to presenters, trade to trade, 2ICs to supers, and even the AGCSA to trade, supers, presenters and 2ICs.

While networking is often associated with office workers ('ties'), the turf industry network is well and truly powerful and alive. The unique feature about our industry is that the people within it will freely and willingly offer assistance and advice to those that seek it.

The thing to learn about networking is the bigger your network the more doors will open, the more knowledge that can be gained, the more problems that can be solved. For those that where in attendance we hope you enjoyed the content and forums that where provided and that you gained just as much from discussions with peers and friends.

For those that haven't been to a conference or workshop for a while, remember that the real value of these gatherings can often lie beyond the education provided. Problems that you have could be solved by your peers at a conference/workshop, or at least you may lean on others experiencing similar problems.

Talking of 'leaning' on people, it is important also to acknowledge another network – the partners of members of the turf industry. These people (often ladies) are an important cog behind the industry and it was a pleasure to have more than two dozen of them in Cairns during the week.

In fact, by recognising that partners are the backbone behind the industry, we are looking at the prospect of having a partners/supers workshop as part of the Melbourne conference educational program. We could open the discussion with a topic such as "How and when should you offload on your partner".

The AGCSA is also strengthening its network with other Australian golf bodies through the Australian Golf Industry Council (AGIC). In its initial year the council has brought many issues to the table – the environment and water to name just two – and it has been the AGCSA it has turned to for expert advice which reinforces our valued reputation within the industry.

Through the network, we (AGIC members) are already sharing communications and collectively supporting the growth of golf in Australia. This may ultimately mean more golfers playing, an increase in income into the sport which could flow on to bigger maintenance budgets and more money in supers' pockets.

The AGCSA also recognises the need to support up and coming superintendents in developing their networks by setting up a mentoring program for assistant superintendents and groundstaff. Mentoring can be an extremely rewarding experience.

We have already had a handful of superintendents put their hands up but we will require more to meet the number of eager 2ICs and groundstaff that could benefit from this programme. Please contact the AGCSA if you would like to become a part of this rewarding scheme.

Finally, having indicated the importance of a face-to-face network, we can now announce the AGCSA is moving further into the technological age (which, ironically, has less human interaction). The conference in Cairns has been recorded in history and through modern technology we will be able to use video streaming to your desktop. This will hopefully allow superintendents (particularly those in country locations that are staff deficient) the opportunity to experience (at least half) of the education available during conference week.

We look forward to seeing you at the spring workshops in October which will allow you further opportunities to expand your network of contacts.

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BY DANIEL G. S. COOK

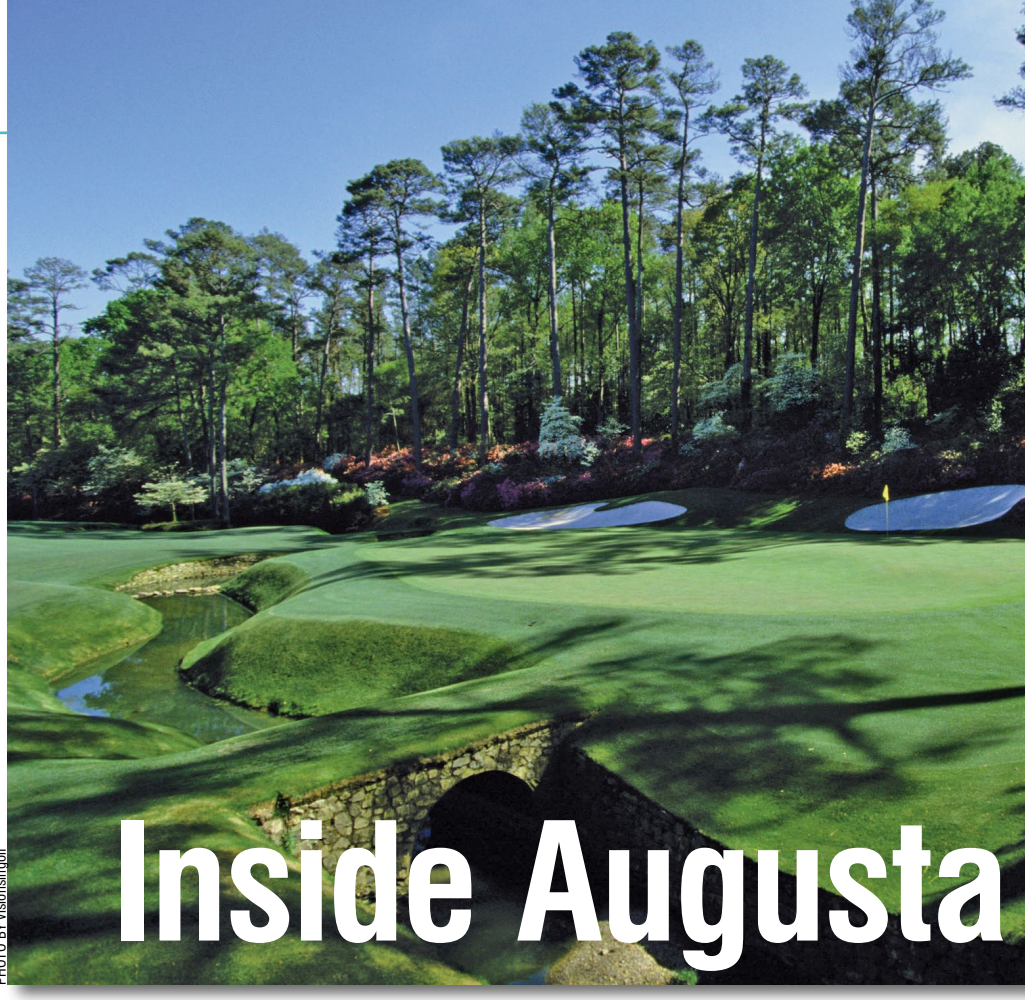


PHOTO BY visionsingolf

Inside Augusta

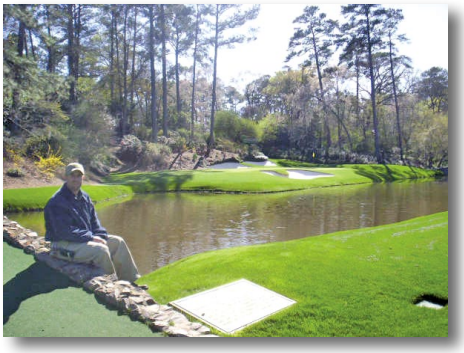
The Ohio State Program has seen numerous Australian greenkeepers work at some of America's finest golf courses, but for Daniel Cook it ultimately led to his employment at one of the world's most talked about clubs - Augusta National. For the past two years Cook has been part of the Augusta inner sanctum but said goodbye recently in order to come home and fill the vacant superintendent position at Elanora Country Club in Sydney. Cook, who was the first Australian to be part of the management team at Augusta, gives ATM an exclusive look inside the US Masters venue to see how it ticks from a turf management perspective.

My very first memory of Augusta National Golf Club was watching Greg Norman blow a six shot lead on the back nine to lose the 1996 US Masters to Nick Faldo. While the Shark's demise was hard to watch I couldn't help but notice the immaculate presentation of the golf course. It seemed like a mythical fantasy land that epitomised perfection and for a young greenkeeper starting out in the industry it instantly became 'the' course that I had to visit.

That same year I had started as a groundsman at Mona Vale Golf Club in Sydney, a position which I held for a year before being offered an apprenticeship at Monash Country Club. After finishing my qualifications and staying on there, I was contacted by Greg Armstrong from The Australian Golfing Fellowship of Rotarians. He was involved with issuing a scholarship for an Australian qualified greenkeeper to attend the Ohio State Program in the United States.

Snapping up the opportunity, my first placement was at Kingsmill Golf Resort and Spa in Williamsburg, Virginia, in the heart of the 'transition' zone. From there I headed south to The Polo Club of Boca Raton in West Palm Beach, Florida which was undergoing a $7 million reconstruction. I arrived as assistant superintendent and left as superintendent.

My next stop was Oak Hill Country Club in Rochester, NY which at the time was gearing up to host the 85th US PGA Championships. While there I worked under director of golf Paul Latshaw Jnr. and superintendent Tom Bailey IV. My stay here was to achieve two major goals - complete a sector on a cool-season course and work a Major.



National

The striking 13th green and surrounds of Augusta National Golf Club. Australian Daniel Cook was privileged to work at the club for the past two years and was given the opportunity to manage the back nine greens for the 2007 US Masters

The Donald Ross design was flawless and with Latshaw Jnr. at the helm it was ranked that year alongside Augusta National for course conditioning. Again I kept hearing and thinking of that fantasy land Augusta National that every one compares themselves too.

Preparation for the PGA had started about three years out with the installation of a new irrigation system and total bunker renovation. Working for Latshaw Jnr. was one of the most demanding yet rewarding experiences of my life. Notching up 100-plus hours a week with only one day off in eight months leading up to the tournament was a true test.

The week of the tournament was quite remarkable with the maintenance crew swelling to 150. Some of the amazing aspects of the week included push mowing the six inch (150mm) rough inside the ropes with 20 rotary mowers so as not to lay down any rough. The rough was fluffed daily from tee to green and we walk mowed approaches up to 80 metres out from the greens.

With my US visa about to expire, I returned Down Under and found employment under Peter Watts at Terrey Hills Country Club. Working at a championship course in Australia was great and I was involved with all aspect of course management.

I had not planned to move on until I was contacted out of the blue by Nelson Caron who had taken a new assistant position at The Honors Course in Ooltewah, Tennessee. He needed a wing man and was willing to help me through the difficult visa process.

I was excited to work on another top 100 course and it offered me a chance to work on zoysia fairways and Penncross greens. Superintendent David Stone is one of the guru's of zoysia and looks after the Pete Dye design in perfect harmony with its natural setting.

The major event of their calendar year was the US Mid-Amateur Championships. I was responsible for managing the greens for this event, being primarily in charge of the back nine as well as coaching one of the interns preparing the front nine.

THE DREAM BECOMES REALITY

Following the tournament David arranged for me to go on a tour of Augusta National Golf Club to fulfil my long-held dream. I toured the property with director of golf Marsh Benson and although it was the middle of summer the course blew my mind. It was an amazing experience and right then I vowed I would have to return here at some point in my career.

Not long after I was sitting down with David and I asked him where he thought my next career move should be. His recommendation was immediate – Augusta National. He had continually heard me talk about Augusta after my return from the tour and as luck would have it through his network of contacts he put me in touch with Augusta National superintendent Brad Owen to start the process rolling.

Not surprisingly the process to become part of the inner sanctum at Augusta was an exercise in patience. All prospective staff members are put through a barrage of interviews and tests to ensure they are suitable. The first part of the process involved a phone interview with Brad and Augusta HR manager Sean Moore. They asked me a variety of questions ranging from general queries about my interests through to specific agronomic questions and scenarios. I also had to undertake a PI test (personal index) and once I had successfully applied for my visa (an expensive exercise) I then had to undergo a drug test upon arrival.

With all the HR criteria met, which included the signing of a confidentiality agreement whereby I am not allowed to divulge certain aspects of the club's make-up and agronomic operations for a period of 10 years, I was welcomed to Augusta. I was ready to fulfil a dream I had held for nearly a decade.

A YEAR IN THE LIFE

To give you an overview of operations I will try to go through a year in the life of an employee at Augusta National. The main stages are membership play, the US Masters, transition, the summer and overseeding.

The course is open to membership play from October through May. This is the playing season and the focus at this time is to prepare the course day-to-day as best we can. During these months any areas that are still not as ▶

strong as they need to be after overseeding are reseeded until an acceptable stand of ryegrass is achieved.

The turf species include a pure stand of A1 bentgrass on the greens with 419 couch and Celebration couch (a new shade-tolerant variety available in the US) on the fairways, tees and second cut which are overseeded for the playing season with annual ryegrass.

Maintenance practices at Augusta are designed to be site-specific, impact play as little as possible with most activity happening early before membership play. Morning maintenance practices comprise mowing greens, margins, clean ups, tees, raking greenside and fairway bunkers, course set up, watering (if required), debris blowing and fairway mowing (if required). Also, all ranges are prepared before play.

During the middle of the day a lot of detail work is carried out to have little or no impact on play with smaller equipment used to create less noise. The afternoon maintenance can include mowing fairways and second cut (there is no rough at Augusta). This is to avoid clippings and disruption of the majority of the day's play.

The greens at Augusta are a sight to behold. Pure is too less a word. Generally they are big in size (I can't divulge their exact measurements) but their undulations are quite remarkable and some have massive false fronts. Excessive movement means that poor positional play is punished. Jack Nicklaus, who holds the record for the most Masters victories (six), once said that if you put a 10-handicap golfer in the middle of every green in regulation they still wouldn't break 90!

MAJOR COUNTDOWN

As the season goes on, striving for perfection continues as the Masters tournament quickly approaches. Although attention to detail is always a high focus point this becomes more important the closer we get to April.

As the tournament approaches all maintenance practices intensify. The mowing regime is increased to produce the most pure ryegrass and bent surfaces possible. Any mowing pattern changes happen early to train the staff and to ensure the course is in an aesthetically pleasing condition.

PHOTO COURTESY OF SETH JONES, GOLF COURSE MANAGEMENT MAGAZINE, GCSAA

The 10th at Augusta National which up until 1935 was actually the course's opening hole

Bunker maintenance also starts to gear up about 60 days out. All bunker sand depths are checked, both greenside and fairway, and they are edged, cleaned and reshaped on a daily basis to ready them for the major championship. They are raked with leaf rakes when dry and with another type of rake if wet to fluff them up. This is a high focal point during the tournament and as such sufficient resources are spent to maintain them.

Green speeds are closely monitored ensuring consistency day to day and green to green. The results are recorded and any maintenance practices are modified to achieve 'membership speeds' or 'tournament speeds' (these are a closely guarded secret).

The tournament maintenance schedule goes up well in advance with all staff and volunteers being named and scheduled. This gives every one a chance to become very familiar with their tasks and their personal schedule for the event. Going into the event all staff work longer hours than usual and there are no days off during this push. A huge number of volunteers are added to the staff for the tournament while the equipment fleet can double and even triple in some areas as extra machinery is brought in.

As the tournament approaches water management becomes very important. The greens go to hand watering only 60 days out. Also leading into the tournament tissue testing of the greens is carried out on a fortnightly basis. This is done on site by an Augusta National employee and gives us a chance to watch the greens lean down in a controlled manner.

While the turf is finetuned for its big date, there is also the flurry of activity in and around the course. The television towers and spectator grandstands are continually being erected and the main spectator entrances are prepared for the masses and security checkpoints moved into place. During this time the nursery crew responsible for all the trees, shrubs and azaleas (there are about 1600 azaleas from tee to green on the 13th hole alone) are also flat out to make their areas complement the perfect turf.

The weekend before the practice rounds, the ropes and stakes go up to outline the 'in-play' and 'spectator' areas. At this time the real tournament feeling sets in and the focus for the maintenance team narrows in on the in-play areas. The acreage is greatly reduced and with resources growing with the presence

PHOTO COURTESY OF SETH JONES, GOLF COURSE MANAGEMENT MAGAZINE, GCSAA

The 12th at Augusta National rates as one of the best and most difficult par 3s in world golf

of the volunteers and extra equipment we can zone in on all the smallest details. No details are too small.

SHOW TIME

When the practice rounds start there are a lot of strange feelings that go through you. You're excited to see the all the top players in the world play the course; tense as the greens start to get extremely dry and firm in perfect tournament condition; and upset to see all your hard work in the spectator areas being destroyed by foot traffic.

There is also another feeling which is hard to describe, but I will try to explain it. There are never too many people on the property at Augusta during the playing season. Now it is strange to see tens of thousands walking around. It feels like they are invading your own piece of paradise. I guess it's like Charlie and the Chocolate Factory in a way – all these people are lucky enough to have a golden ticket for one week of the year, other than that it is closed to the outside world.

Being part of the assistant team under Brad, I was fortunate enough to be entrusted with looking after the back nine greens for the duration of the 2007 Masters. Words can't describe how proud I felt when I was told I was being given this role. The feeling was one of approval and trust. It was also a major test of my abilities to see whether I could handle the pressure. I had done so at the US Mid-Amateur but this was the Masters.

This year it was dry and warm heading into the Masters so we had a great dry down. The greens were monitored all day leading up to the event with syringing where required. Most of the hand watering took place at night to make the greens as good as they could be for morning play.

The fairways and second cut were also extensively hand watered to keep as firm and fast as possible without losing colour. We also carried out routine checks for disease outbreaks, constantly checked the mowers for quality of cut, as well as repaired and dusted ball marks and checked old plugs.

This year's tournament was one of the toughest in recent history and it was also one of the driest. We dodged some pop up showers during the practice rounds and enjoyed producing firm fast playing conditions.

The weather though was much colder than normal. We had two frost delays on Saturday and Sunday morning of the tournament and if the cold was not enough the wind blew too. Fortunately we didn't have to worry too much about plant health as far as water was concerned but we did always have to consider playability and receptiveness. We didn't want good shots to be punished.

It was an amazing experience to take greens that far and not go over the edge. The pressure was immense and anything less than perfect was unacceptable. It was an awesome experience and I am definitely one of a privileged few.

SEASON'S END

As the tournament passes Augusta is open for one month after the event for membership play. ▶

During this time we try to repair all tournament damage. The TV towers and observation stands are removed for another year to return the course to pre-tournament condition.

The season comes to a close in May (the start of the summer) and this is when all the renovations begin. The greens are cored continuously throughout the summer and topdressed where possible. Shade tents and fans are put up on the greens where required and the cooling systems in the greens get a good work out to get the bentgrass through the tough stretch of hot, humid weather. Disease pressures are very high with pythium being at the top of the list.

All disruptive construction and renovation practices happen in the summer. Some turf work is done to reverse any spectator damage during the tournament. Agronomic focuses are on the continued health of the bentgrass and to promote the couch to be as healthy as possible. A pre-emergent programme comes into affect now and any weed control is also carried out.

As the summer rolls on, thoughts go to the September overseed. All the work that went into producing healthy couch is quickly scalped down. The process takes seven to 10 days depending on the weather conditions. Shortly after the overseed a tinge of green appears and another growing/golfing season at Augusta National is born.

A SAD DAY

I have huge respect for Marsh Benson (senior director) and superintendent Brad Owen for the responsibility they gave me and the valuable experience I had while I was at Augusta National Golf Club.

Brad has been at Augusta for 20 years and has worked his way up to superintendent after starting out many years ago as a mere intern. He is a fine detail sort of guy who lets nothing get past him and believes there is no such thing as "it can't be done".

I will take many things away from my time at Augusta. While the agronomics were second to none, the most important lesson I learnt was that it's the small things that count. Attention to detail is what separates the excellent from the exceptional. Sometimes these can be so small that you don't even recognise them. I also learnt that planning is the cornerstone of success.

Beyond Augusta National I was given the opportunity to interview at Elanora Country Club for the superintendent position. The thought of returning to the northern beaches of Sydney where I had grown up and started my career was great. Fortunately I was successful with my application and on 20 August I started my new posting.

It was a sad day to walk out of Augusta National for the last time. It was very emotional to return my keys and credentials and know that I didn't have access to the amazing facility that is Augusta National. I will always smile as I embark on my challenging new role back in Australia with the experiences at Augusta strongly in my memory. The road to Augusta National and beyond has been the experience of a life time.

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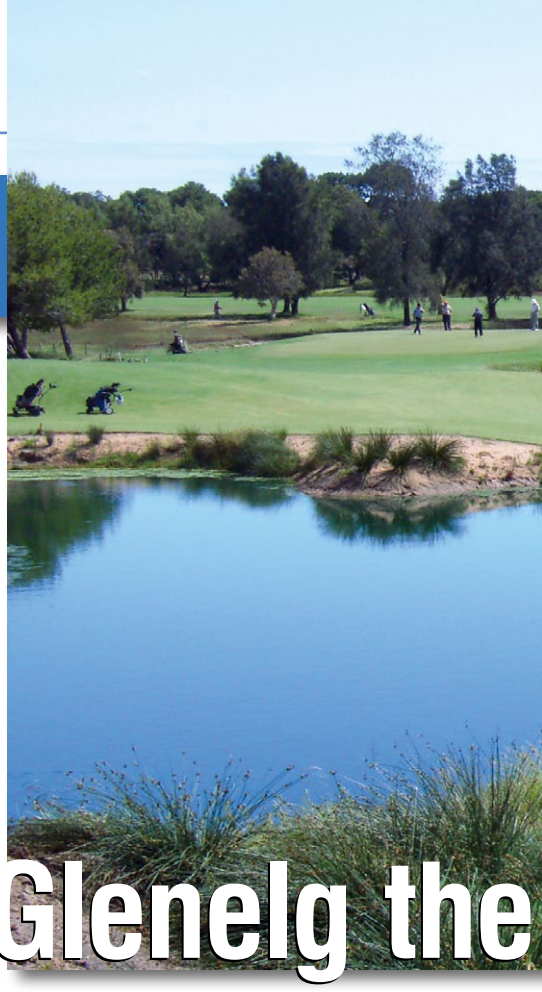
BY DARYL SELLAR

A major course redevelopment in recent years also gave Adelaide's Glenelg Golf Club a perfect opportunity to investigate options to secure its future water source



As well as undergoing a substantial course redevelopment in recent years, Glenelg Golf Club in Adelaide has also embarked on a groundbreaking $1.5million aquifer storage and recovery scheme. Daryl Sellar outlines this innovative project which will effectively ensure the club's future water supply and demonstrates how the turf industry is again providing proactive and sustainable solutions to combating Australia's water shortage crisis.

ASR scheme gives Glenelg the

Formed in 1927, Glenelg Golf Club is located on the original Fulham Sand Dune complex that once formed Adelaide's coastline, but now lies one kilometre from Gulf St Vincent. A Group 1 private club, Glenelg has some 1500 members and hosts its share of state and national events, as well as corporate and charity days throughout the year.

The course is situated on 49ha, and despite its sand dune features has many low lying areas that were once tidal and estuarine marshes, resulting in variable soil types and a very shallow saline water table within a metre of the surface in many areas.

Since its inception the course has been irrigated with bore water from two aquifers (T1 and T2) that lie between 100 and 200 metres below ground. Bore locations have been many and varied throughout the club's history, with reports of bores "going salty" or losing productivity, and new locations being drilled.

Up until 1973, these bores were sufficient for the times to supply the manual irrigation system for the course. However, at that time the club was offered unlimited Class B effluent water from the nearby Glenelg Treatment Works, and so irrigation potential warranted the club investing in an automatic irrigation system. From this point until 2005, the course has been irrigated with various combinations of bore and effluent water.

ADELAIDE'S WATER MANAGEMENT

Being located in the western suburbs of Adelaide and in close proximity to the Patawolonga (one of the city's largest stormwater outlets), Glenelg Golf Club is acutely aware of the increased pressure being placed on Adelaide's water management system. Urban development in recent decades has seen an increase in hardscape and resulted in increased pressure on the city's stormwater system, which has seen significant flooding of surrounding neighbourhoods and the golf course itself.

The western suburbs of Adelaide have always had a rich history of horticultural activity, and as a result have utilised groundwater for irrigation for many years. This usage increased dramatically as industry moved into the area, as well as increased residential use, and we have been aware of the impacts (increased salinity, slower recharge, etc) of this increase in extraction for a number of years.

COURSE REDEVELOPMENT

From the late 1990's, the club embarked on a staged course redevelopment, initially with a view to improving turf quality. As the redevelopment moved into its second stage in the new century, it was evident that the quality turf the club was seeking was not going to be sustainable without addressing the water management issues the club faced.

The Glenelg ASR scheme demonstrates what can be achieved when golf clubs are proactive with water management strategies

green light

The redevelopment provided the opportunity to improve drainage throughout the course through construction features and engineering, effectively raising the playing surfaces above the water table and reducing their susceptibility to inundation during heavy storm events. However, irrigation water supply for the club required some more strategic thinking.

In 2000, a Quality Turf Plan (QTP) was developed for the club, and considered the issues limiting our ability to produce and sustain the quality of turf we were seeking.

Irrigation management then and into the future was fundamental to the QTP. It included the facts about the existing water supplies, with both the bore water and effluent possessing elevated pH, high levels of sodium, bicarbonates and chloride, total soluble salts of between 1100 and 1300mg/l and low calcium.

In addition to the effects the water supplies were having on plant and soil, the Class B effluent supply had nutrient levels that were not desirable for producing sustainable quality turf, and restrictions on hours of use due to public health considerations.

The QTP highlighted in detail the management strategies necessary in utilising these water sources. But it also recommended the club investigate better quality water sources, and consider the use of some existing and proposed wetlands throughout the course for the potential harvesting and treating of stormwater that could be reused for irrigation.

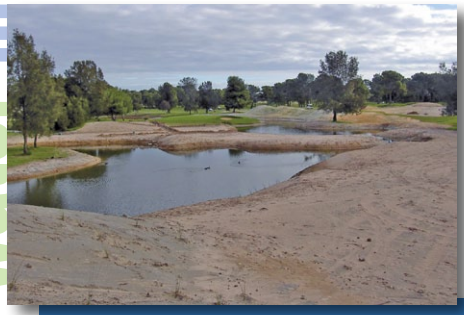
OPTIONS AND FEASIBILITY

In considering the club's options for water supplies for the future, we were mindful of many factors, including quality and quantity, cost, restrictions on use (quantity and hours), irrigation system capacity, community impacts, storage requirements, safety, sustainability of supply and environmental impacts.

All options were considered, including discussions with the relevant authorities regarding the likelihood of the Glenelg Treatment Works being able to supply Class A effluent in the future. We felt this option would have had enormous environmental and community benefit in reducing effluent outfall into Gulf St Vincent, as well as eliminating restrictions on hours of usage (in place for Class B) for health reasons.

Being mindful of the stormwater management issues of the local community, we also consulted the Patawolonga Catchment Water Management Board (PCWMB - now Adelaide and Mt Lofty Ranges Natural Resources Management Board) about the concept of harvesting local stormwater and treating it through existing and proposed wetlands to a quality that would allow it to be pumped into the underlying aquifer for extraction when required (known as aquifer storage and recovery or ASR). Despite quality benefits, the use of mains (potable) water was never entertained.

After carefully considering the economics of either class of effluent and the stormwater harvesting concept, the club decided to pursue the latter option, with modelling suggesting we could effectively harvest, treat and store ▶



Construction of the wetland system on the par 3 16th at Glenelg which formed part of the reconstruction project

our annual water requirements with some surplus, so that in effect we will be contributing positively to the Adelaide Plains aquifer while utilising it.

One significant aspect of the feasibility work carried out was the modelling of the fate of the water once injected into the aquifer. This revealed that due to the very slow lateral movement of water within the aquifer (0.5-1m per year), even after 50 years of injecting more water than we extract, the 'bubble' of fresh water around the injection point is expected to remain within the Glenelg Golf Club's immediate boundary.

At this point, the club entered into a partnership with the PCWMB to develop a design brief that could go out to tender for design and construction.

At the same time, a submission was made by the PCWMB to the Federal Government for funding through the Australian Government Water Fund towards three projects that were designed to assist the western Adelaide Plains stormwater management problems. All three projects involved similar projects at golf clubs, the other two being The Grange and Royal Adelaide, and highlighted the potential for golf clubs to play significant positive roles within our local communities.

This submission was eventually successful, and saw the anticipated $1.5 million cost of the project broken down as follows;

- 50 per cent Federal funding;
- 25 per cent PCWMB (now Adelaide and Mt Lofty Ranges Natural Resources Management Board); and
- 25 per cent Glenelg Golf Club.

ASR SCHEME

Considerable time was spent investigating the most efficient means of harvesting stormwater for the club's needs and included;

- Gravity fed local catchment;
- Storm event pumping from local catchment;
- On demand pumping from adjacent Brownhill Creek; and
- On course site suitability for wetland development.

Topography, economics and water availability eventually resulted in the preferred method of harvesting being on-demand pumping from Brownhill Creek, which has a catchment area extending to the Mt Lofty Ranges, but also includes the local area catchment.

As a result, Brownhill Creek has annual flows in excess of 7.5 gigalitres, and retains permanent water that can be sourced as required, and allows pump sets to be considerably smaller than if we were required to capture the peak flows of major storm events. The scheme will have six major stages, which are as follows:

1. HARVESTING

This involves the pumping of water from Brownhill Creek as the water level within the wetland system demands with pumping rates projected at 30l/second.

The harvesting point for the scheme was critical to the success of the project as the relative height datum (RHD) of the proposed pump site is within one metre of the water level that can be influenced by salt water intrusion.

2. SEDIMENTATION

Water pumped approximately 500m from the creek will move into a sedimentation pond on the course. This 1500m^2 area of open water will allow sediment and gross pollutants to be retained, allowing cleaner water to pass into the secondary wetland. In effect, this will be a secondary sedimentation process, as the harvesting point is downstream of a similar structure within Brownhill Creek.

3. SECONDARY TREATMENT

This wetland will comprise approximately 8000m^2 of heavily vegetated water. The depth of this wetland will vary from 300mm to 1.5m to create variable flow rates which along with the vegetation selected will assist with further sediment removal and associated nutrients and contaminants.

4. TERTIARY TREATMENT

This wetland is already in existence and forms a 5000m^2 water feature on the par 3 16th. In its current form, however, this lake is naturally filled with groundwater from the shallow aquifer system and has salinity levels of between 3000 and 5000mg/l. This saline groundwater will need to be isolated from the harvested stormwater when the scheme is operational.

By the time the final stage of course redevelopment work (which incorporated the 16th) was undertaken in 2004, the club already had conceptual modelling for a proposed ASR wetland system. This allowed course architect Neil Crafter and us to configure a wetland that would satisfy the requirements of the ASR scheme at a later date.

This wetland will provide more open water to satisfy the aesthetic requirements of the 16th hole, but will be interspersed with dense aquatic vegetation to further "polish" the water prior to injection into the aquifer.

Initial modelling suggested the existing wetland would be of sufficient size to meet the scheme's demands, however more recent, detailed modelling has revealed an additional 1000m^2 or so was required. This additional water body area is to be created between the 15th and 16th holes and will frame some significant samphire vegetation which is home to some of the last remaining plant species of their type on the Adelaide Plains.

5. INJECTION

Having moved through the wetland system over a period of 72 hours, the treated stormwater will then be pumped some 700m to the first of two injection and production bores, where it will move into the T1 aquifer at a depth of approximately 100m.

The second injection and production bore is a further 300m away, also in the T1 aquifer system, but at a depth of 200m. This variation in depth is caused by the aquifer flowing across a geological fault which runs through the course, and sees the aquifer connected but at different levels either side of the fault line.

6. EXTRACTION

In conjunction with an additional two production bores, the course will be supplied by four bores in total with anticipated combined production levels of 60l/second.

PLANNING AHEAD

Due to the planning of the ASR scheme starting in 2003, the club has been able to include several key components of the scheme into remaining course redevelopment capital works. These works included;

- Construction of new bore water holding tanks (2 x 250,000l), eliminating use of original open top holding tank;
- Drilling of two new bores to provide the necessary injection and production capacities for the scheme;
- Installation of a new supply line from production bores, and proposed bore sites, to new holding tanks.

These projects have seen the club contribute about $300,000 towards the project already.

Water is pumped from Brownhills Creek into a sedimentation pond on course before moving through a series of wetland cells. After moving through this system over 72 hours the treated water is then pumped to the injection and production bores

The drilling of the new bores was elevated on the priority list in mid 2005 when negotiations with SA Water broke down over the supply of either Class A or Class B effluent, reducing water supply to just 50 per cent of requirements from the two existing bores.

As always, Murphy's Law came into play and despite the best of efforts from all parties to have the new bores commissioned by the start of summer, the irrigation system was not operating at full capacity until the first day of autumn 2006! (Christmas 2005 was hardly relaxing as we were reliant on just one bore for two weeks, with that bore failing within one week of the new bores being commissioned!).

The construction of the wetlands will present a logistical challenge, as the shallow aquifer is within one metre of the surface throughout this section of the course, and this saline groundwater must be prevented from contaminating the treated stormwater. This will see the lake 16th hole that was constructed as part of the 2004 course redevelopment works being drained prior to lining, and with work scheduled to have started in July 2007, fighting nature could be challenging.

Exploratory bore holes have been drilled in the area to determine the suitability of any underlying material for lining of these wetlands. Due to the site's history of tidal and estuarine inundation, a seam of clay of varying depth (1-3m) has been located, with early indications suggesting this material could be suitable. If approved, this material would be excavated and stockpiled which would represent a significant cost saving for the project.

As a result of the wetland construction, it is anticipated there will be in excess of 10,000m^3 of spoil to be utilised. Plans are being drawn up to use this material for screen and safety mounding at the opposite end of the course property along the 5th hole, helping to address some safety issues with this hole and being mindful of possible design modifications that will be required.

SCHEDULING AND SENSORS

For the past seven years, our irrigation scheduling has been based around climatic data and evapotranspiration (ETo). When combined with the conversion of turf species, irrigation upgrades, and improved growing environments as a result of the course redevelopment, water savings of up to 40 per cent have been demonstrated.

In an effort to continually improve our water management at Glenelg we have begun utilising soil moisture sensing equipment, with some models offering temperature and salinity monitoring as well. Over the past six months, this technology has demonstrated the potential to;

- Improve our understanding of the fate of the water we apply;
- Illustrate the influence of renovation techniques and rainfall on salinity management;
- Provide documentation of water use efficiency both for internal and external (regulatory) use;
- Allow remote monitoring of irrigation system performance and soil moisture levels;
- Allow the efficient study of soil/water relationships;
- Accurately monitor effectiveness of "flushing' cycles;
- Provide supporting data for the irrigation management strategies already in place;
- Illustrate the influence of water quality on plant water requirements over time;
- Assist in monitoring of environmentally sensitive areas.

While there is still much to learn about the roles this technology can play, there is no doubt in my mind it has a place alongside the sophisticated control systems and pumps stations we now utilise, as well as the art of greenkeeping.

CONCLUSION

In total, the ASR Scheme for Glenelg Golf Club is expected to cost approximately $1.5 million, with a payback period of 30 years. The benefits of the project include:

- Utilisation and quality improvement of local and greater metropolitan stormwater;
- Provision of up to 400M per year, well in excess of the club's annual water requirements, supplying a net surplus of water in the aquifer as a result of injection and extraction process;
- Improved quality of irrigation water source, with anticipated salinity levels of approximately 600mg/l, with anticipated turf management cost advantages;
- Preservation of good quality water supply for the club for years to come;
- Improvement of water quality within the Adelaide Plains aquifer;
- Reduction in stormwater outfalls to Gulf St Vincent and subsequent protection of marine environment.

The Glenelg Golf Club scheme, and others like it, is a positive demonstration of what can be achieved when golf clubs are proactive with water management strategies. Importantly, these schemes should be viewed as case studies of how turfgrass can be part of the solution to society's water management problems, rather than the cause.

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BY DEAN SCULLION

Kooindah keeps it green

The development of Kooindah Waters Golf Club on the central coast of NSW represents a perfect example of how a new golf course development can benefit and enhance the surrounding environment. Former superintendent Dean Scullion looks back at the project which has set a benchmark for golf course environmental management in Australia.

Kooindah Waters golf and residential resort is located on the New South Wales central coast and is 80 minutes drive north of Sydney and 1km east of the Wyong city centre. Clarendon Resort Housing (CRH) has developed a Ross Watson-designed 18-hole golf course which is surrounded by 252 dwellings, 5-star resort, clubhouse, leisure club and 108 accommodation apartments currently under construction.

Prior to construction the site had been described in the environment impact statement (EIS) as highly degraded. On the site extensive earth works and the removal of vegetation had occurred, dense weed infestations had colonised the earth works areas and actual and potential acid sulphates had been placed at the surface following the excavation of lakes. Large amounts of fill material had been spread across the site some containing coal chitter which was considered contamination.

Additional challenges were faced where a drum dump had been declared over what would be holes 10 and 11. The drum dump was due to a fire of stored paints onsite in 1987. Soils contained heavy metals and extensive remediation was required.

SITE DESCRIPTION

The site is located within the flood plain catchment to the Wyong River and is bounded in the west and south east by two protected Sepp 14 wetlands (coastal wetlands).

A drain system to the east (Zairs Drain) flows through the Sepp 14 wetlands and is also a declared sensitive site by Wyong Council. The southern edge of the site is located 100 metres from the Wyong River which is a main artery into the sensitive Tuggerah lake system about two kilometres to the south east. All water that leaves the site naturally migrates to the Wyong River after filtering through Kooindah's extensive wetland system.

The topography of the site was characterised as flat to gently undulating terrain with low relief, with the average site level being 1m AHD. Groundwater is located between 0.5m and 1.3m below ground surface with samples tested showing high acidity levels and concentrations of some heavy metals.

The history of the site showed the local community had been using the area as a dumping ground for all kinds of waste. Car bodies, steel, household rubbish, garden waste and in particular drums of old paint had been dumped on site creating a significant environmental hazard for the wetlands and community.

DESIGN

Ross C Watson Pty Ltd was appointed by CRH to provide comprehensive golf course design services for the Kooindah Resort. Watson is renowned for designing golf courses that build on environmental qualities and do not compete with the local environment and brought with him a team that included David Hanby (irrigation) and John Neylan (agronomy).

Kooindah is a 6083 metre par 72 and the design offers three distinct character precincts: residential golf, parkland golf and open wetlands. The routing of the course is structured to entwine the three experiences as much as possible.

A key element of the golf course design and landscape strategy has been the incorporation of existing strands of regenerating swamp forest complex and existing areas of SEPP

The design of Kooindah Waters Golf Club has been responsive to revegetation of cleared and degraded areas of the site. Landscape species associated with the alluvial flood plain have been used to provide habitat and corridors for wildlife

14 wetland, together with the artificial wetland system.

Individual stands of swamp mahogany forest have been linked to form corridors between the two SEPP 14 wetlands, creating physical links between these two features.

Landscape plants have been established in an onsite nursery with over 300,000 plants being added to the golf course during construction. Eighty per cent of these plants had been harvested from the surrounding wetlands providing Kooindah with a fast-growing, site-specific indigenous species. Swamp mahogany, Sydney blue gum, turpentine, rough apple bark, *melaleuca*, *casuarina, banksia*, Christmas bush and bottle brush have all been planted.

The design has been responsive to revegetation of cleared and degraded areas of the site. Landscape species associated with the alluvial flood plain have been used to provide habitat and corridors for wildlife.

A family of five squirrel gliders, listed as a vulnerable species, have taken up residence in one of 11 nest boxes set up for this purpose. Seventy-five bird species have also been recorded on site by the central coast arm of NSW Birding Group and frogs have taken to the constructed wetlands, although exact species still have to be identified.

Extensive arrays of grass swales and water bodies have been constructed over the golf course. The approximate areas are:

- Existing wetlands – 80,000m^2
- Constructed wetlands – 82,000m^2
- Lakes – 48,000 m^2

Constructed wetlands (grass swales) are shallow between 0.3m and 0.6m planted with indigenous macrophytes e.g.: *Juncus, Eleocharis, Shoenus* and *Isolepis*. These wetlands (grass swales) provide filtering and nutrient stripping points for improving water quality.

All golf course water drains to the constructed grassed swales and water is tested every three months for nutrient content and loads. This testing is reported to council on an annual basis.

The majority of drainage has falls of 0.5 per cent making the shaping and design of the site critical to removing surface water. This aspect is considered one of the strengths of the site. The site can confidently manage heavy rainfall of 50mm-plus, exceeding construction expectations.

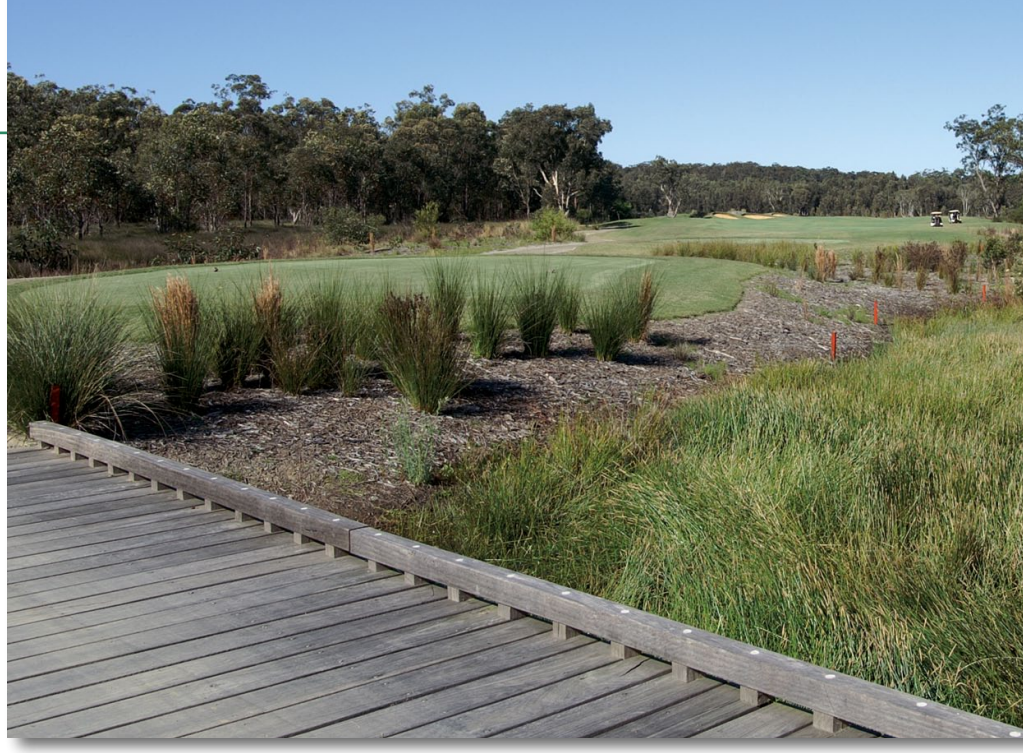
CONSTRAINTS OF THE DA

Approval from regulatory bodies for the project ranged from the local Wyong Shire Council, NSW Fisheries, Department of Land and Water Conservation, National Parks and Wildlife Service through to the Environmental Protection Agency. In total there were almost a dozen. Technical studies required for the development application included:

- Golf, residential and resort master plans;
- Environmental impact statement;
- Vegetation management plan;
- Wildlife management plan;
- Flora and fauna assessment;
- Stormwater management plan;
- Wetlands management plan;
- Acid sulphate soil and environment site investigations;
- Acid sulphate soils management plan;
- Flood impact assessment;
- Aboriginal archaeological assessment;
- Bushfire threat assessment.

FERTILISER MANAGEMENT PLAN

In 2003 John Neylan (AGCSATech) supplied a detailed fertiliser management plan (FMP) that is strictly adhered to at all times. A FMP is required as part of the Wyong Shire Council's DA. The council approved the plan which ▶



allows the following loads of nitrogen and phosphorous per annum.

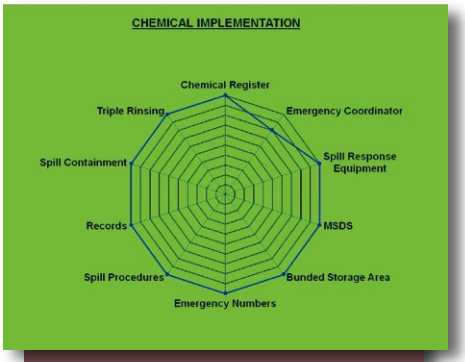
- Nitrogen 172kg/ha and phosphorous 50kg/ha for tees and fairways per annum;
- Nitrogen 150-200kg/ha and phosphorous 50-80kg/ha for greens.

A nutrient register is kept on site recording all annual fertiliser applied and the actual N:P:K in kilograms/100m^2. In the first year of maintenance 146kg/ha of nitrogen was applied to the fairways saving 26kg/ha off the FMP estimates. This confirms the FMP is being followed and protects Kooindah from false accusations regarding fertiliser applied.

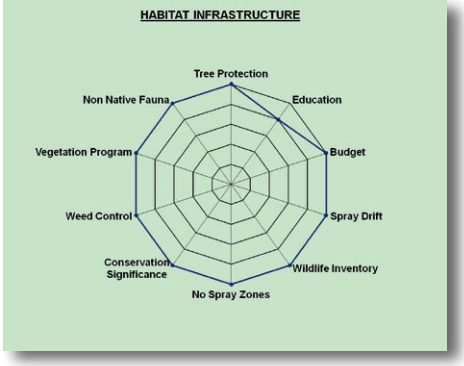
Light frequent leaf applications are made to greens, tees and fairways with no fertilisers being applied to the roughs. Spoon feeding in this manner reduces the risk of nutrient leaching and maximises nutrient uptake.

The roughs provide the buffer between the wetlands and the fairways. No fertilising occurs within five metres of the Sepp 14 wetland boundary.

Soil samples from greens, tees and fairways are taken on a six monthly basis to monitor nutrient levels and to only apply the elements that may be deficient. The topsoils used for the fairways are very fine silt like. Calcium has been applied at 12kg/100m^2 to help displace sodium and to balance the calcium/magnesium ratio. Sampling at six monthly intervals helps to amend the fertiliser programme as required.



With a dedicated and comprehensive environmental management system in place, Kooindah is able to chart its performance in a variety of key areas



Fertiliser and chemical storage is kept to a minimum to reduce the risk of storing dangerous goods. The onus is put on the supplier to supply and deliver the fertiliser a day or two before the planned application.

CHEMICALS

Pesticides are applied only when critically needed, although a preventative fungicide programme is applied to all greens throughout summer to protect the club's greatest asset.

Insecticide is only applied if damage to the plant is considered to affect or disrupt play. Herbicides are applied via a controlled droplet applicator (CDA) or via spot spraying. This has reduced the amount of herbicides applied conventionally by 50 per cent.

IRRIGATION

Irrigation water is drawn from a subterranean aquifer via five bores. The water quality is very poor with the pH level dropping to 2.9 during summer. The water also contains elevated iron, aluminum, sodium and chloride levels which are due to the lake level dropping to a point where acid sulphates affect water pH. This happens during the heat of summer when the system is under pressure.

The lake is actually constructed in a sand lens and it was decided for cost reasons not to have it sealed. The lake will also recharge during rainfall as the aquifer rises and water leaches through the sand without the help of the bores.

If the lake level is pumped below RL-0.5 saline water from the Wyong River can enter the irrigation storage lake and make it unusable. Several survey pegs located in the bank of the lake to indicate this critical point.

As the water table drops during dry periods so does the lake regardless of the fact we are pumping in one megalitre a night from the bores. The bores are programmed to transfer water leading up to the night's irrigation so we can make use of the 1M pumped in.

We estimate we lose 120,000 litres per day to the aquifer via the sand lens during dry periods. Irrigation is scheduled to coincide with the lake being at its highest point during any one day. We have had extended dry spells where no irrigation was applied to fairways.

Kooindah is licensed to pump 300M from the aquifer but in the first year of maintenance 250M was pumped saving 50 million litres of extracted ground water.

Water samples are being taken from the bores and the irrigation storage lake on a six monthly basis to monitor water quality. In addition, monthly water samples are taken from the five bores and the storage lake to monitor total dissolved salts (TDS) and pH. The storage lake is constantly monitored to ensure the TDS levels remain stable and to keep an eye on pH. The monthly sampling is recorded and kept on site.

All irrigation and rainfall run-off is designed to drain back to the drainage swales. Most swales also have a sand lens that we located at RL 0.3. The water in the swales leaches through the sand lens and finds its way back to the aquifer technically to be re-pumped to the golf course, a natural recycling process.

Light frequent leaf applications of fertiliser are made to greens, tees and fairways with none applied to the roughs. Spoon feeding in this manner reduces the risk of nutrient leaching and maximises nutrient uptake

ENVIRONMENTAL MANAGEMENT

With a firm commitment to environmental stewardship, a decision was made to develop an environmental management system (EMS) for Kooindah. We wanted an easy to follow system, one that met international standards, was golf specific and importantly cost effective.

The risk of an environmental event in the turf management profession is simply too great to ignore. We needed to provide the club and its staff with reasonable protection in the event of an environmental incident. It was decided that Terry Muir would be engaged to build our EMS using the e-par system and in February 2006 the process began in earnest.

To begin the process of developing and implementing our EMS an initial review of our operations was conducted. This provided a broad snapshot of the club's current environmental status. It took about two hours and while we had the best infrastructure with new washing, chemical, storage and fuelling areas we lacked operational procedures, training and induction and evidence of a commitment to the environment.

An environmental policy statement was developed using the programme templates which outlines the club's commitment to the environment and is signed by senior management.

ENVIRONMENTAL RISK ASSESSMENTS

The Kooindah site provided an exceptionally challenging situation to complete an environmental risk assessment. The worksheets in the programme provided a clear and systematic procedure which offered a smooth and timely completion of the assessment.

All the activities we would undertake are listed in the worksheet together with their potential impact on the environment. This assessment showed a number of areas where we needed improvement but it also showed over 21 positive environmental risks which we were able to document.

This risk assessment process then drove ▶

the rest of the EMS process where strategies were put in place to manage the identified risks. For example, it was identified that the lack of staff environmental induction/awareness was a significant issue. We quickly addressed this by writing out an action plan stating we would run an awareness seminar. We ran the seminar as part of our EMS training and effectively demonstrated we were managing the risk.

Another example was fuel delivery in which we had no procedure in place. We had a new facility but no procedure. We downloaded the fuel delivery procedure from the programme and managed that risk as well. We have now implemented standard procedures for all of our significant activities.

We then went through the process of building an organisation chart following the templates supplied. Then a matrix showing our communication protocols with stakeholders was also built.

In case we have an environmental emergency we are also prepared at Kooindah as the programme provides us with an emergency preparedness and response matrix.

One feature of e-par that is very beneficial for superintendents is the daily and weekly checks. These are just simple checklists of important parameters that are checked off every day.

For example we have a fuel tank visual inspection procedure and the checklist requires a visual check of the tank and the bund daily. Recently during one inspection it was found the emergency shut off was faulty. We were able to rectify it immediately before any emergency situation developed.

CONTINUAL IMPROVEMENT AND REPORTING

At Kooindah we are committed to continual improvement in environmental performance and we are always told to regularly communicate and educate how well we are performing environmentally. We conducted a Community Forum on 28 September 2006 to communicate our innovative programme of environmental stewardship to 60 of our neighbours and local regulatory agencies. This was an extremely productive exercise.

Having the EMS we are confident that everyone working for or on behalf of Kooindah is competent to meet their environmental responsibilities. We use an environmental induction booklet to induct all staff and we use the contractor's procedure to induct contractors.

We can develop environmental action plans that lay out actions. Not only do we set action plans but we monitor performance. Using our EMS we can document 300,000 native plantings, the return of squirrel gliders to the site, nutrient testing and performance.

There are many benefits of having an EMS including improved management of environmental issues related to the operations and maintenance of our golf facility. There is increased staff awareness, everyone is accountable for their actions and we were confident we are prepared in the event of an environmental incident.

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BY NATHAN BENNETT

Earlier this year The Sands, Torquay become one of the first golf clubs in Australia to install a dedicated reverse osmosis water treatment plant to solve water issues burdening the facility. Superintendent Nathan Bennett outlines the project and what it will mean for one of Victoria's newest championship courses.

RO plant secures future for The Sands

The Sands, Torquay is a 195-hectare, fully integrated resort development located in Torquay on Victoria's Surf Coast. The project boasts a championship golf course, designed by Stuart Appleby along with International Management Design, which has been set up to challenge all golfers.

The land was originally purchased back in the early 1990s by Malaysian developer Dato Hussain Yassuf for the purpose of developing a golf/equestrian complex. The development ran into trouble and stalled after damage was caused to the wetlands through bulldozing native vegetation.

Resin bead filters initially reduce particles in the water down to 50 microns before the water is pumped into the RO unit

This is when the Handbury Group, owned by Paddy Handbury, became involved in 1999 and gained approval for the development in mid-2002. Start date for construction was late 2002 and the course was completed at the end of 2003. The clubhouse was completed by March 2004 and the club was opened four months later.

When developing The Sands, Torquay, Handbury and the designers had the foresight to ensure that the course had a permanent water supply. This was achieved by tapping into the Class C pipeline exiting the Black Rock Sewerage Treatment Plant operated by Barwon Water about four kilometres from the course.

The quality of water supplied varied from average to very poor with the salt readings ranging from 1000ppm to 1700ppm and sodium levels up to 300ppm. This was having a significant effect on turf quality, which was particularly evident where we had two holes watered with stormwater.

Jazz Water, a company co-owned by Handbury and Wayne Ellery, needed to build a prototype RO plant (reverse osmosis) which they could collect data from. This was needed to satisfy the EPA in regards to building a larger plant in the future.

Such a plant would effectively solve the water issues the course was facing and construction started in earnest last Christmas and finished at the end of March 2007. Once all the finetuning and commissioning had been finalised the plant was up and running by Easter.

TREATMENT PROCESS

Water is first pumped from a large dam situated next to the course into a holding tank. As the water is pumped in it is dosed with sodium hypochlorite which kills off any bacteria and organics. The water is then sucked out of the holding tank and dosed with ferric sulphate, a flocking agent which causes all the matter in the water to stick together creating larger particles.

The Sands, Torquay is looking forward to the coming summer after installing a dedicated reverse osmosis water treatment facility

The water is then pumped through large filters filled with resin beads which are all the same size. These filters are able to collect all the particles in the water now that they are larger due to the flocking agent. The filters are able to reduce particles in the water down to 50 microns.

The clean water is collected in a holding tank ready to be pumped through the RO unit. This clean water is also used for back-washing the resin filters every four hours, with the waste or brine then pumped out into an evaporation dam near the unit.

The clean water is then pumped into the RO unit and again dosed with ferric sulphate. It passes through two more resin filters reducing the particle sizes down to five microns. Once it passes through the filters it is dosed with hydrochloric acid to drop the pH to between 5.5-5.8. It is also treated with Hypersperse (an anti-scaling chemical) which stops scaling of the membranes.

The membranes remove the salt and minerals out of the water. These membranes are like long rolls of toilet paper (about 4m long), densely wound up fibres with a hollow centre. The water is pumped through the membranes at around 300psi, with the low water pressure in the middle of the membranes drawing the fresh water to the centre (reverse osmosis) leaving the salty water still in the membrane fibres.

There are 12 long membranes broken into two groups of six and as the water passes through the first three of each group the fresh water is collected. The salty water collected is passed back though the next two membranes and once again the fresh water is collected. Finally the salty water is then passed back through the last membrane. The salty water that comes out of this is about 4000ppm which is then pumped into the evaporation dam.

The fresh water from the centre is collected and dosed with sodium hydroxide to raise the pH to 6.5-6.8. After this process has taken place the water is stored in a 38,000-litre tank and once this is full the water is pumped down to the irrigation dam on the course.

The unit puts out between 40,000-50,000l an hour and in a full day of operation can ▶

produce around 0.9M of irrigation water with a salt reading of between 150ppm-200ppm. The sodium levels have dropped from 307ppm to 76ppm, the adjusted SAR down from 13.3 to <2.5 and bicarbonates down from 174 to 78.

From a turf management perspective the new water is less precipitating compared to the old water (i.e.: more available calcium and magnesium). Now we have reduced the issues with the high salt and sodium levels we will have to keep an eye on the nutrient levels in the greens as the water may increase nutrient leaching which in turn may increase the amount of calcium and other amendments we need to apply.

The treated water will be used to irrigate the course from tee to green. As the unit was fully operational by mid-April 2007, we didn't have much of a chance to see a result from the improved water as our watering reduced soon after the supply started. This coming summer will be great, as now we have a full supply of good quality water and, touch wood, we will never have to use Class C water again.

Last summer our stored stormwater that services 16 holes was quite low so we had to water greens with Class C, and even on a normal rainfall year there would be a certain amount of Class C water applied to the greens.

The greens watered with Class C were thinner, the leaf a lot broader and also seemed to be a lot less disease and drought resistant.

Despite the plant's high operating costs, The Sands feels that is outweighed by the fact that the course now has a good quality, permanent water supply

Water is pumped through membranes at around 300psi. The low water pressure in the middle of the membranes draws the fresh water to the centre leaving the salty water still in the membrane fibres

We had to apply a lot of gypsum to reduce the nutrient lock-up caused by the sodium and we had black layering in low areas due to the large amount of sulphur in the water. Hopefully these issues will now be a thing of the past.

Another main issue when using Class C was the time restrictions in place for watering. We were only allowed to water from 9pm to 2am, but now with the RO plant we can water whenever we like.

One of the drawbacks of the RO unit is that it is not cheap to run. At the moment it is powered by its own generator which uses around 700l of diesel a day (when running at full capacity). A large quantity of sodium hypochlorite is needed as the quality of water coming into the unit is very poor, but other chemicals required in the process are used in far less quantities. The Sands, Torquay feels that the expense of running the unit is outweighed by the fact that we now have a good quality, permanent water supply.

From a maintenance point of view the groundstaff don't have to touch the unit. Jazz Water has an experienced person come down and service it once a week which includes back-washing of all filters, air scouring of the filter tanks and water tests at each treatment stage.

The installation has attracted a fair bit of interest around the industry with a couple of clubs enquiring and making visits. The nearby Barwon Heads Golf Club is in the process of installing a similar unit and there has been a lot of interest from the local community, sporting bodies and construction companies regarding the possibility of buying water to help out their situation.

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BY KATE HARRIS

Kate Harris explains how two golf courses on the south coast of NSW have adopted a natural approach to managing high nutrient levels in their irrigation reservoirs.

Improving reclaimed water quality

These days everyone seems to be looking for ways to use water more efficiently. As the pressure grows, the use of reclaimed wastewater for golf course irrigation is being considered a vital step towards a more sustainable future. Fortunately there is a goldmine of experience out there.

As the recent AGCSA Reclaimed Water Users Survey (2006) highlighted, a number of golf courses throughout Australia have been using reclaimed water for irrigation for more than 15 years. However, this survey also identified a number of respondents who were having difficulties in dealing with elevated nutrient concentrations, in particular nitrogen and phosphorous.

It has long been recognised that the best known solution for high nutrient management in stored water is to mimic nature and create natural filter systems with constructed wetlands. However, in reality, recreating a natural system can be almost impossible to incorporate into existing water storages due to land availability or unnatural water level fluctuations.

This article examines how two golf courses on the south coast of NSW successfully overcame their high nutrient levels and subsequent severe algal issues by floating wetland plants on rafts in their reservoirs. Both Catalina Country Club (superintendent Tony Fogarty) and Tuross Head Country Club (turf manager Geoff Coleman) used this innovative solution because there were very few options for managing the regular algae outbreaks at both their reservoirs.

First, the cost of augmenting the local STP for nutrient reduction was too high to consider. Second, the use of chemical or biological additives was considered too expensive as both a short- or long-term solution. Last of all, major modifications to the reservoirs to construct surface or subsurface wetland systems were impractical as:

- The size of the reservoirs could not be increased as it would encroach into the golf course greens;
- The reservoirs could not be filled in to establish a wetland zone as this would reduce valuable water storage; and
- The water levels could fluctuate by a metre or more, which would dry out or flood a conventional wetland system.

TREATMENT PROCESSES

The rafted reedbed system installed at both Catalina and Tuross Head consisted of a buoyancy raft made of recycled, UV-stabilised plastic, upon which a coir mat with pre-grown plants was installed.

The rafted reedbeds depend on two key processes to provide water quality treatment. First, the curtain of roots growing through the raft helps to calm water flows which in turn accelerates the rate of sedimentation. This reduces suspended solids and attached pollutants such as nutrients (phosphorus) and heavy metals.

Second, the roots provide a very large surface area that maintains a biofilm of beneficial microbes that also treat pollutants by bacterial metabolism. For water quality improvement, this microbial activity provides an environment for denitrifying bacteria, the microbial reduction of nitrate to de-nitrogen gas. The microbial activity also assists in the removal of phosphorus and heavy metals from the water column by aggregating these free floating compounds that eventually become part of a sludge layer.

The Tuross Head rafted reedbeds after one year's growth

DESIGN CRITERIA

Despite the widespread use of floating wetlands for a wide variety of purposes around the world, there is still currently no standardised design basis for sizing a floating treatment wetland to

The rafted reedbed systems installed at both Catalina and Tuross Head (pictured) consisted of buoyancy rafts upon which a coir mat with pre-grown wetland plants was installed

achieve a desired pollutant removal objective. However, there are a number of key studies that form part of the existing knowledge base.

One of the early reported attempts to quantify the effect on algae was undertaken by the Japanese River Restoration Team in 2005. They found that floating reedbeds covering 25 per cent of the water surface reduced total phytoplankton cell numbers by 90 per cent.

Another major study was undertaken for Severn Trent Water, a UK water utility (Garbett, 2005). The results indicated an orthophosphate reduction of up to 95 per cent, and equally impressive reductions in phytoplankton cell numbers. This was achieved using a 490m^2 raft in a 3.4ha reservoir, representing a 0.15 per cent surface area.

Lastly, a Belgium system designed to treat combined sewer and stormwater overflows in a detention basin covered 25 per cent surface area. Preliminary performance showed the removal of 33-68 per cent chemical oxygen demand (COD), 66-95 per cent suspended solids (SS), 24-61 per cent total phosphorous (TP) and variable total nitrogen (TN) removal.

When designing the rafted reedbed system for Catalina and Tuross Head, a key issue was the size needed to treat the algae problem. The effectiveness of any wetland system is dependant on the size of treatment system. As described in the above studies, the overseas literature suggested a range of favourable results from as little as 0.15 per cent coverage to as much as 25 per cent coverage.

Regardless of other studies, another consideration in developing the design for Catalina and Tuross Head was the unique site characteristics.

On the one hand, treated effluent has been used at Catalina Country Club for 26 years to irrigate 18.3ha of greens and fairways, making it one of the oldest examples of large scale effluent re-use in Australia. The Catalina reservoir holds 30M of treated effluent and stormwater, is 4m deep and covers an area of 1.1ha. Conversely, Tuross Head has only begun to use treated effluent in the last two years. The reservoir is plastic lined, relatively shallow at 1.5m and covers an area of approximately 300m^2.

PLANT SELECTION

The choice of wetland plants for the golf course reservoirs was relatively easy as many of the overseas rafts use wetland plants endemic to Australia. For Catalina and Tuross Head a mixture of local endemic wetland species were used including:

- *Phragmites australis*
- *Juncus usiatus*
- *Cyperus exaltatus*
- *Eleocharis sphacelata*
- *Baumea articulate; and*
- *Schoenoplectus vallidus*

CATALINA COUNTRY CLUB

In 2003, prior to the current project, the reservoir at Catalina was fitted with aeration and mixing pumps to treat frequent algae outbreaks. The ▶

result had been a change in algae types, with the aerated conditions favouring blue green algae. As further blooms occurred over the summer after the aeration and mixing equipment was installed, an alternative method was sought to address the problem.

In 2004, council commissioned an Algal Management Plan (AMP) as the blocking of irrigation spray heads and pumps following summer algal blooms worsened.

Data collected by the club and analysed provided the best estimate of baseline nutrient levels prior to the rafted reedbeds being installed for this study. TN levels in the dam over the period September 2002 to August 2004 averaged 2.18mg/l. The peak value recorded in April 2003 was 4.1mg/l. TP levels in the dam waters over the same period averaged 6.21 mg/l. The peak value recorded in August 2004 was 8.2mg/l.

The AMP recommended a treatment to bind sediments, but with an initial cost of $115,000 followed by on-going treatments that would cost a further $200,000 per annum this was beyond the resources of the club.

As the intention of the study was to firstly treat the algae problem, it was decided that additional treatment was needed in conjunction with the rafted reedbeds to help reduce the high phosphorous levels in the Catalina reservoir. For this reason, a permeable reactive barrier (PRB) was installed in December 2005 at the inlet with the aim of reducing TP by around 50 per cent.

The breakwall was constructed using 150 tonnes (100 cubic metres) of blast furnace slag sourced from the Port Kembla steel works. The slag provides a relatively cheap supply of lime (calcium) that is slowly released into the water when submerged. The calcium bonds with the phosphorus, and the new compound is not available for algae.

The water quality was monitored over the six months following the installation of the breakwall. The effluent was monitored at four points, starting with the incoming effluent. The results of most interest were the reduction in the phosphorus (Table 1).

The installation of a permeable reactive barrier combined with the rafted reedbeds has seen a dramatic improvement in water quality at Catalina Country Club

Before the breakwall was installed, the background level of TP was 6.21mg/l. After installation, background TP had reduced to 3.7mg/l (monitoring between January and June 2006), representing a 68 per cent reduction. However, while it was a significant reduction, it was not enough to reduce TP to a level that would safeguard the reservoir against further algal blooms.

In November 2006, 300m^2 of rafted reedbeds were installed on the reservoir, representing a three per cent surface area. The rafted reedbeds were installed as 6x50m^2 islands, anchored within the reservoir. As the system was installed in spring 2006 using pre-established plants (six months old), the growth was over a metre by the end of autumn.

To date there have been no algae outbreaks and this includes the relatively dry summers of 2006 and 2007 when there was not much incoming stormwater to dilute the concentration of nutrients in the reservoir. According to golf course management, algal blooms would normally be expected under such dry conditions. The islands have attracted many compliments as a visual amenity. They have also provided habitat for native birds, although during establishment serious pressure by swamp morehens meant full bird netting was required.

Other maintenance issues to date have been anchoring the rafts against the wind and a large flood event, where water rose over one metre, which caused the rafts to move. If further rafts are needed, better anchoring is required.

TUROSS HEAD COUNTRY CLUB

The physical attributes of the Tuross Head Country Club site provided different conditions to use rafted reedbeds for algae control.

The reservoir is comparatively small compared to Catalina, as it is only 300m^2 in surface area by 1.5m deep, and is also lined with black plastic. The golf course has 20 acres of greens and fairways under irrigation.

It did not take long for algae to reach problem levels during the reservoir's short life span. Within four months of construction, a strong unpleasant odour emitted from the reservoir even during winter, which could be smelt by passing traffic.

Also, the surface of the reservoir was covered with a scum of algae. In regards to the algae, this problem had been anticipated as a state of the art filter system had been installed to ensure treated effluent would not clog filters and sprinklers.

The smelly, unsightly algae problem was so severe that the golf course received numerous complaints from neighbours. With the summer

TABLE 1. WATER QUALITY RESULTS AFTER INSTALLATION OF PRB AT CATALINA (JANUARY-JUNE 06)

ANALYTE	SAMPLE POINTS						
	1	2	% Change	3	% Change	4	% Change
PH	7.2	7.9	8	8.6	16	9.3	22
T Calcium	35.1	31.3	12	15.1	132	25.9	36
T Nitrogen	10.9	7.9	38	6.3	72	3.5	211
T Phosphorus	10.0	7.0	43	6.2	62	3.7	175
Orthosphos	8.2	7.9	3	5.0	65	4.4	87

of 2005/2006 coming up, the installation of the reedbeds was considered a priority by management in December 2005 in an attempt to solve the problem.

In response to this problem, a 125m^2 rafted reedbed was installed in late December 2005. The raft covers 30 per cent of the surface area, a substantially larger surface area than that at Catalina because the problem was severe and results from overseas applications suggested larger areas are more effective than smaller areas.

Within a short span of one month, the problems with the algae and odour were removed. For the rest of the 2005/2006 summer, there were no more problems with odour or algae covering the reservoir. The reedbeds have also provided ecology within an artificial reservoir. Frog sounds can now be heard in the reedbeds and a number of birds can be seen sheltering between the reeds.

The Tuross Head rafted reedbed provides the best understanding to date of the likely maintenance requirements. Overseas case studies and practitioners suggest a range of maintenance is needed. For example, a German firm consulted throughout the project advocated the need for little to no maintenance. However, investigation of American websites indicates the need for higher maintenance regimes, which could be related to the raft design and the degree to which their systems are geared for water quality treatment.

After 18 months of growth on the Tuross Head site, approximately three hours of labour was required to spot spray weeds. This could ultimately be overcome with the right selection of species to maximise competition against weeds, but at this stage, it appears that a small amount of maintenance is inevitable.

CONCLUSION

The rafted reedbeds at Catalina and Tuross Head reservoirs have provided two Australian road tests of how this technology can be specifically used to manage high nutrients in stored water.

In the case of the two very different reservoirs, the rafted reedbeds worked effectively to reduce algal outbreaks on both a large (30 per cent) and small (three per cent) surface area. Although this is in the range reported overseas, more study on these sites will be required to identify a design criteria for determining the right size for this application.

The plants selected and raft design has proven to be suitable for the installations at both sites. Regular check-ups on the root systems underneath the rafts have found the curtain is established rapidly and after the first growing season reaches 600mm.

In the current quest for water re-use, these case studies provide another tool for treatment of water quality. It is especially useful where there are constraints of cost, space availability and fluctuating water levels. The benefits of installing rafted reedbeds are not only general water treatment but also the additional visual amenity and ecological enhancement.

Management at both sites are happy with their choice of installing rafted reedbeds to manage the high nutrients in their stored water. They found a cost effective, long-term and natural solution and have avoided expensive ongoing costs of chemical additives.

THE PULSE

The recent 23rd Australian Turfgrass Conference in Cairns attracted over 300 delegates for a week of networking and professional development. In light of the turf industry's largest annual gathering, The Pulse wanted to know what sort of value superintendents placed on conferences, trade and association days, higher education and networking and what specific tools or resources they enlisted in their day-today operations to help broaden their own knowledge.

MARK PARKER
Concord GC

Delegation is without doubt the most important part of my professional development. A gradual learning curve made me realise the role delegation plays in most facets of management. Delegation, apart from all the other benefits, creates the time to ensure I can research and carry out the varied functions of the modern day superintendent.

Collectively, many of my colleagues and I are improving our delegation responsibilities, with the use of e-par being a major role that many assistant superintendents have now been entrusted with.

Time management through delegation provides the opportunity to keep abreast of the latest information whether through the internet, journals or books. I personally find myself reading less books and turning to short articles which can be easily digested in a small amount of time.

I suspect the formal educational was critical in my progress in management, however, I now find communication with colleagues one of the most valuable tools of education. This communication is critical and I source it through local superintendents and conferences alike.

Our industry needs are constantly changing and we need to keep abreast of all information to ensure a reasonable response can be delivered when a member or committee person raises issues. I find articles that feature in the media regarding turf, golf, water etc are generally a source of the query, and as such, it is valuable to ensure you are prepared for the questions likely to be raised.

Finally, outsourcing through other industries has always proved beneficial in providing fresh ideas. I will often pick up a journal from other professions and industries when available and continue to be amazed at the relevance it may have in our own industry.

ANDY BLACKER
Thaxted Park GC

Legislative requirements dictate much of the modern day superintendent's duties. While OH&S is nothing new, the paper trail we must keep is growing all the time. Throw into the mix environmental and staff management requirements combined with the standard reporting duties a superintendent undertakes and it is no wonder that on some days it's hard to get out on the course at all.

Today's superintendent needs to be really well organised. Without well-structured systems in place you can end up chasing your tail. It is becoming really important to have qualified staff to help ease the burden and to allow the delegation of some administration duties. Making the start is often the most difficult step and the old adage that 'any system is better than no system' can often be true.

With so much emphasis on administration and managerial duties, professional development training may need to be widened to incorporate all of the legislative information turf managers need to help them achieve compliance. It is important that the training available to superintendents is broad enough to cover all aspects of the role. With so many training events available supers then need to evaluate and prioritise to suit their own needs.

Finding the balance between managing, training and keeping your own track up to scratch is a constant juggling act. It is easy to allow professional development to play second fiddle to other pressures. Superintendents have raised the professionalism bar considerably over the years and this is in no small way due to the hard work of organisations such as the AGCSA and state bodies. It is important that we continue this trend in the future. There are a lot of professional development tools out there and the good thing about the turf industry is that the training quite often comes to us.

BRETT MORRIS
University of Sydney

Superintendents who are interested in furthering their development have a number of supportive resources at their disposal, but recognising those resources which are of benefit can be confusing at times. Beware the Google search. Although it may seem that there are relevant research articles available online, the majority are not peer reviewed. If you are interested in looking at more technical articles, try the US-based Turfgrass Information File.

If a superintendent is looking for career advancement, a key challenge will be how they can distinguish themselves from others. Education modules outside of the traditional turfgrass management degree may be advantageous, particularly in areas such as business management studies, incorporating financial, human resources and marketing.

If a superintendent is currently in a stable role, desires by upper management for leaner operations may require the incorporation of higher education into their development. Masters degrees provide not only an advanced understanding of the turfgrass plant, but also soil, water and fertility interactions. Combining the science of higher education with the practical experience of the superintendent can give them confidence in knowing that they are managing their facility to the best standard possible with their available resources.

But does it mean that you have to have a degree to be successful and content? I've personally learnt some tremendous tips from fellow superintendents at conferences while sharing a beer and discussing similar challenges experienced. It's up to the superintendent themselves how far they want to go, but the whole spectrum of formal proceedings at conferences, online learning to informal gatherings are invaluable sources of personal and professional development.

WAYDE LEECH
Noosa Springs GC

Education and continuing education is imperative. Club directors, committee members, club managers and owners are increasingly drawn from the professional ranks. They expect the person given the stewardship of the core asset of their property will be able to provide clear-cut, well researched advice on a range of subjects and display leadership. Being able to use the literature or provide independent evidence to support your case is vital at times.

Given these demands and the escalating amount of regulatory red tape that has to be dealt with, most superintendents need a wide range of skills. Education (and of course experience) can provide those skills needed to operate in today's and future business environment. A solid agronomic background via trade and/or tertiary training supplemented by human recourses and financial management training will need to provide the central skill set for current and, importantly, future supers.

How each individual pursues these goals is a matter for them based on their perceived strengths and weaknesses. I fully understand that family and other demands can make continuing education difficult. Thankfully there is a wide range of training options available to engage in. However, education need not be formal in nature to provide value. Conferences, field days and seminars can give opportunities to refresh or add to formal training.

I also regard our fellow superintendents as a great source of information. Superintendents here on the Sunshine Coast get together on a semi-regular basis to exchange ideas and address problems we all face. Our only (very loose) criteria is that everyone comes with one question. These informal open forums are well supported and throw up some innovative ideas and solutions. As a wise man (my dad) once said, "knowledge is no cross to bear".

GARY DEMPSEY
New South Wales GC

The position of superintendent has changed dramatically in the 33 years I have been in the industry. The most significant changes would no doubt be in the areas posed in this question. I enjoy my profession as a superintendent but I do miss being a greenkeeper. In saying this it highlights the different approach I have to my business these days.

I have two specific tools which ensure smooth day-to-day operations of our golf club - people and planning. Every good businessman will tell you that a good manager always surrounds themselves with good employees. Here at NSW Golf Club I have two assistant superintendents and six qualified greenkeepers who in that role, should, can and do oversee safe passage of the golf course on a daily basis. The need for me to be greenkeeping is diminished, therefore allowing my efforts to be directed to a managerial role.

That role encompasses many diverse areas, but none more important than planning. In the early 1990s we developed a five-year strategic plan. That plan has been revisited every five years and is for me and the club a clear and precise directional document which drives the continued development and improvement of the club.

I have found over the years that conferences, association days etc promote and instil the fact we are a fraternal group that is very supportive of each other. I place great value on this as I would not be in the position I am today if our industry did not foster these qualities.

Higher education is a personal choice and if someone feels it will help them achieve their ambitions then they should pursue it. For younger people I am a big fan of the Ohio Internship Program. The confidence and enthusiasm it encourages has been a great asset to me.

superintendents and clubs golf course maintenance practices

See page 60 for more information

BY JOHN NEYLAN AND ANDREW PEART

The bentgrass vegetative propagation trial site at Evergreen Turf

When AGCSATech was established in 2000, part of its charter was to undertake applied research projects funded from income derived through AGCSATech services. Since 2000 the AGCSA has funded several projects and continues to undertake research with supporting funding from Horticulture Australia Ltd. John Neylan and Andrew Peart review the latest results to emerge from two current projects.

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BENTGRASS VEGETATIVE PROPAGATION PROJECT

The aim of this project is to further explore the potential of the bentgrass (*Agrostis* spp.) clones that have been collected under the research programme that started at Kingston Heath Golf Club in April 2001. With over 500 clones or off-types collected from around Australia, several have been identified as potentially having superior turfgrass colour, quality and density.

Part of this project will explore whether there is a potential for vegetative propagation through sod production techniques rather than traditional seed production methods as these superior quality bentgrasses that have been identified are very low seed producers.

Twenty of the best performing bentgrass selections that were planted in a greens nursery at Chisholm TAFE, Rosebud in May 2003 were transplanted into plots at Evergreen Turf, Pakenham in October 2005.

As well as these 20 individual selections, five blends were also created from a mix of three selections from these 20 individuals. Each blend contained a range of different textured selections i.e.: dense type, aggressive space filler and an intermediate type.

The plots have been rated for turf and surface quality on a fortnightly basis since achieving a full grass cover in December 2006. The selections chosen for further work were sourced from the following locations;

- Royal Adelaide GC – 10th and 11th greens
- Flinders GC – 4th green
- Avondale GC
- Royal Aust. Engineers GC – 4th green
- Cheltenham GC – 9th green

The trial has been established on a sand profile with two planting rates – 0.28m^3/100m^2 and 0.42m^3/100m^2. The plant material consisted of thinly sod cut turf that was shredded into small stolons using a scarifier. The stolons were spread evenly over the surface, pushed into the sand using the back of a rake and then watered in. Growth cloth was placed over the top to conserve moisture and to minimise erosion.

At this time there is a significant difference between the planting rates for Selections 1 and 21 (Table 1). Of the five selections, Selection 1 appears to have the most rapid rate of establishment. Irrespective of the difference between the selections the trial indicates that establishment by vegetative propagation is possible.

TABLE 1: ESTABLISHMENT RATE OF VEGETATIVELY PLANTED BENTGRASS ECOTYPES % AREA COVER

Selection*	9/7/07	19/7/07	10/8/07
1a	5.7	11.7	9.0
1b	16.7	21.7	23.3
3a	5.7	11.7	14.0
3b	9.0	11.7	13.0
15a	5.0	6.7	9.0
15b	5.0	11.7	11.3
19a	5.7	8.3	10.7
19b	12.7	16.7	17.3
21a	5.0	8.3	9.0
21b	9.0	16.7	19.0
LSD p<0.05	5.8	7.8	9.0

* 1 = Royal Adelaide 11th; 3 = Flinders 4th; 15 = Avondale; 19 = Royal Aust. Engineers; 21 = Blend (Royal Adelaide 10th, Avondale, Cheltenham 9th). a = 0.28m^3/100m^2 b = 0.42m^3/100m^2

BENTGRASS SALINITY TOLERANCE

Research conducted by Lunt et al. (1961), Harivandi et al. (1992) and Marcum (2001) indicate that creeping bentgrass is considered moderately sensitive (3-8dSm^{-1}) to salinity, with grasses such as colonial bentgrass (*Agrostis tenuis*) and velvet bentgrass (*Agrostis canina* L.) considered very sensitive to salinity.

To date there has been only limited progress in developing new cultivars with improved salt tolerance from vegetative sources in Australia. In 2001 Marcum found a considerable range in the salinity tolerance of creeping bentgrass cultivars, with Mariner, Grand Prix, Seaside and Seaside II being salt-tolerant, L-93, Penn G2, 18th Green, and Syn 96-1 moderately salt-tolerant, and Avalon, Ambrosia, SR1119, Regent, Putter, Penncross, and Penn G6 salt-sensitive.

The objective of the study was to compare plant growth and compatible solute content of a

There has been significant difference in establishment rates of the bent plots

Thirty-nine creeping bentgrass cultivars were propagated for the salinty trials

number of vegetatively grown sources of creeping bentgrass across a range of salinity levels.

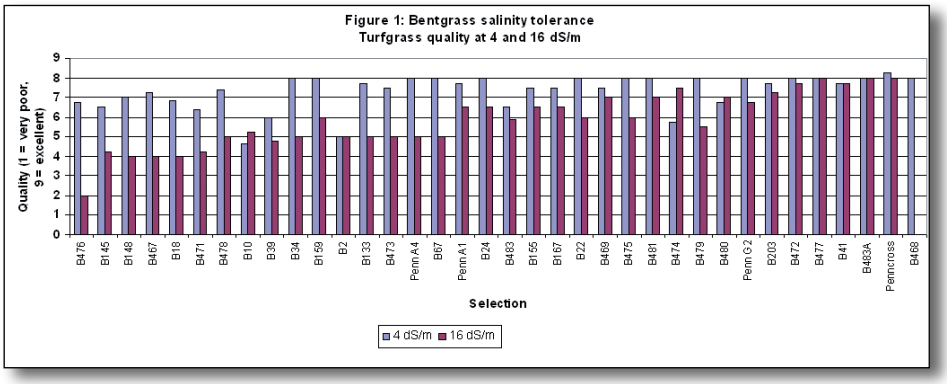
Thirty-nine creeping bentgrass (*Agrostis palustris* Huds) cultivars from saline and non-saline sites in Victoria and South Australia were vegetatively propagated and subjected to solutions of varying salinities. Grasses were held at 4, 8, 12 and 16dSm^{-1} for 10 weeks to determine tolerance to chronic salinity stress. Throughout the experiment, grasses were clipped twice a week at 5mm height.

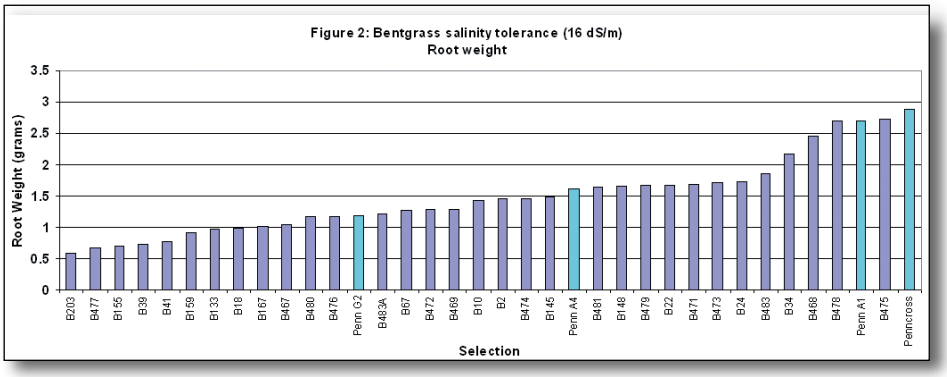
At each harvest the relative dry weight of leaf clippings (RLW) and plant quality were recorded. At the termination of the study shoot and root rates were harvested, washed and dried at 80^{o}C in an oven for 24 hours. Visual quality of turfgrass quality, assessing colour, shoot density and uniformity were determined prior to each harvest. Turfgrass quality was rated on a 1-9 scale with 9 being the best turfgrass quality. Unacceptable turfgrass quality was deemed at being <7.0 on the scale.

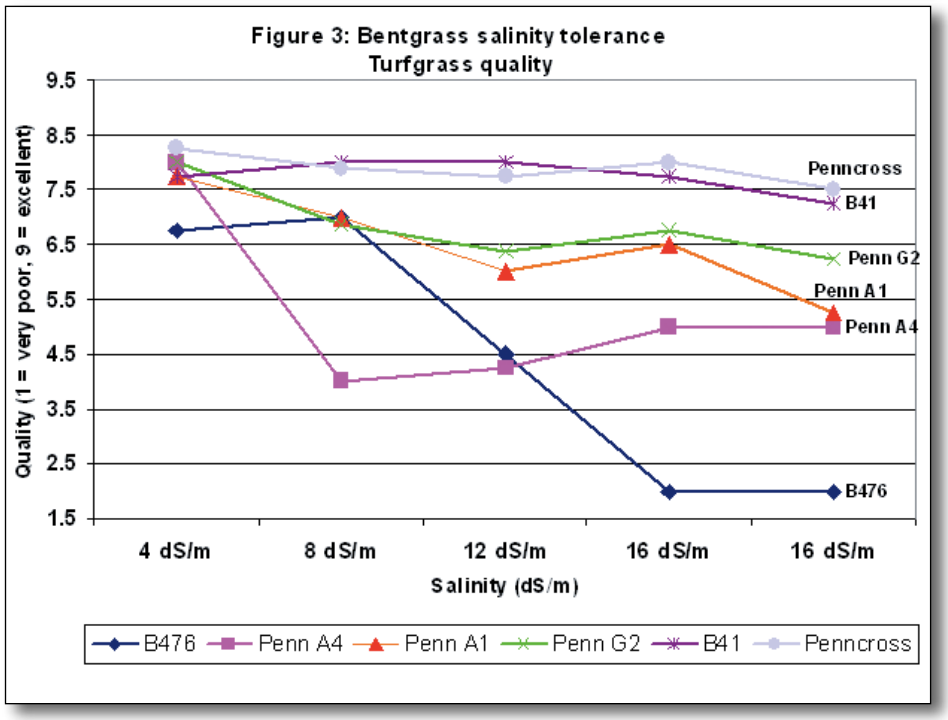
RESULTS AND DISCUSSION

There was a significant variation in turfgrass quality ratings (Figures 1 and 2) between the bentgrass ecotypes at a salinity of 16dSm^{-1}. The industry standards Penn A1 and Penn G2 were about mid-range while Penncross exhibited the highest tolerance along with two of the selections from saline sites.

Root weight was also significantly affected by salinity with Penncross, Penn A1 and two of the selected ecotypes the least affected (Figure 3). Further salinity trials are to be conducted with the treatments applied as a surface application. This will provide a better determination of the surface affects of increasing salinity levels.







POA ANNUA CONTROL IN CREEPING BENTGRASS

Poa annua is treated by most turf managers as a weed to be eradicated. Most treatment methods give variable results and repeated treatments are necessary to prevent the proportion of *Poa annua* from increasing.

The difficulty in achieving control is due to the large seed bank of *Poa annua* and the potential for year round germination and rapid seedling growth (Lush 1988). This gives *Poa annua* a competitive advantage over other species in mixed swards where the *Poa annua* can colonise bare areas left by mature *Poa annua* plants that have died due to chemical applications or environmental stress.

Poa annua-dominated swards can consist of numerous ecotypes from true annuals through to those that are true perennials and this further complicates any control strategy. ▶

BY JOHN NEYLAN AND ANDREW PEART

TABLE 2: CHEMICAL TREATMENTS AND TIMING OF APPLICATION

	Timing of Application			
Treatment	Spring	Summer	Autumn	Winter
1	P1 monthly			
2	P2 (x 2)	-	P2 (x 2) + D (x2)	-
3	P2 (x 2)	-	P2 (x 2) + B (x2)	-
4	P2 (x 2) + Et	-	P2 (x 2) + D (x2)	-
5	P2 (x 2) + Et	-	P2 (x 2) + B (x2)	-
6	P2 (x 2) + Et	En	P2 (x 2) + B (x2)	-
7	En	En	En	En
8	Untreated Control			

For any *Poa annua* control programme to be successful both pre and post emergent control is required (Lush 1990).

Poa annua has a definite life cycle that has been described by Lush (1988) as follows;

- Flower heads and seed head production in spring and autumn;
- Seedling germination in autumn and spring;
- Development and growth through autumn to late spring;
- Die-back and senescence in mid-late summer.

Herbicide control strategies have generally concentrated on post-emergent control with some limited use of pre-emergent herbicides. Post-emergent control can be very difficult due to the different ecotypes of *Poa annua* that occur which have varying susceptibility to the available herbicides.

Once *Poa annua* is established in bentgrass it is very difficult to eradicate and the ideal strategy is to prevent the germination of seeds and to prevent the flowering and seed set so as to reduce the seed bank.

The object of this project is to provide more effective control/suppression through the strategic applications of post and pre-emergent herbicides in combination with an effective seed head suppressant that coincide with the key periods of the life cycle. That is;

- Seed head suppressant applied prior to flower initiation;
- Pre-emergent applied in late summer through autumn;
- Post-emergent applied in spring, summer and early autumn.

The project is being conducted at two sites - Commonwealth Golf Club (VIC) and Bonnie Doon Golf Club (NSW). At both sites the following chemical controls are being applied according to the schedule in Table 2. Additional treatments of other test products are also being evaluated.

- **Paclobutrazol (P1 and P2)** – post-emergent control. P1 = application rate x 1, P2 = application rate x 2
- **Dithiopyr (D)** – pre-emergent
- **Bensulide (B)** – pre-emergent
- **Ethephon (Et)** – flower inhibitor
- **Endothal (En)** – post-emergent

Variation in *Poa* types collected from Commonwealth Golf Club. Clockwise from top left Type 7, Type 6, Type 5 and Type 1

TABLE 3: COMMONWEALTH GC - AVERAGE POA ANNUA %

TREATMENT	% Poa annua plants			
	20/12/06	20/03/07	11/05/07	2/07/07
T1	8.8	5.5	8.0	13.8
T2	8.8	5.0	5.5	13.0
T3	8.8	3.0	7.3	6.8
T4	6.3	3.5	8.5	9.3
T5	7.5	3.5	6.0	5.5
T6	6.3	2.3	8.5	6.5
T7	8.8	3.5	9.3	10.5
Control	10.0	5.0	16.3	15.5
P<0.05	ns	ns	3.2	5.1

RESULTS TO DATE

COMMONWEALTH GC

The assessment in March 2007 indicated there was a natural decline in the *Poa annua* population over the summer months. At the May assessment all treatments were resulting in a significant reduction in the percentage of *Poa annua* (Table 3 and Figure 10) with the endothal treatment having a significantly greater *Poa annua* percentage compared to Treatments 2 and 5.

At the July assessment, Treatments 3, 4, 5 and 6 all had significantly less *Poa annua* than the control. Treatments 3, 5 and 6 all had significantly less *Poa annua* than Treatments 1 and 2. What would appear to be a trend at this time is that the combination of post and pre-emergent herbicides and seed head inhibitor is the most effective treatment.

BONNIE DOON GC

At this site there is no significant difference between the treatments at any of the assessment dates (Table 4). The general trend would appear to again favour the combination treatments.

With this early set of data there will be a revision of the application rates for the post-emergent treatments in an effort to achieve a higher degree of control.

TABLE 4: BONNIE DOON GC - AVERAGE POA ANNUA %

TREATMENT	% Poa annua plants			
	5/02/07	14/03/07	22/06/07	19/07/07
T1	16.3	17.5	52.5	35.0
T2	17.5	16.3	53.8	40.0
T3	15.0	13.8	56.3	45.0
T4	12.5	15.0	58.8	35.0
T5	15.0	12.5	41.3	31.3
T6	13.8	13.8	43.8	32.5
T7	16.3	15.0	56.3	32.5
Control	16.3	18.8	53.8	50.0
P<0.05	ns	ns	ns	ns

POA ANNUA ECOTYPES

The variable control of *Poa annua* in creeping bentgrass is believed to be due in part to the numerous forms or ecotypes of *Poa annua* that can occur in a single area of bentgrass. The repeated use of particular herbicides is also responsible for selecting out resistant strains so that over a period of time there is a greater proportion of the resistant strain(s) compared to when the herbicide applications first commenced.

In order to investigate the effects of various herbicides on the different *Poa annua* ecotypes, five *Poa annua* plants were selected from each plot at the Commonwealth Golf Club site prior to the herbicide applications starting. The plants have been planted into pots where they have been grown on and then measured for plant height, growth habit and seed head production. A total of 160 plants have been collected and assessed.

At the end of the trials (two years) 10 plants will be collected from each plot (a total of 320 plants) and then characterised to determine what changes (if any) has occurred in the ecotypes present.

RESULTS TO DATE

One-hundred-and-sixty *Poa annua* plants have been collected from the Commonwealth Golf Club site and grown on to a mature plant and the following assessments made;

- Plant height;
- Plant diameter;
- Presence of flowers;
- Number of flowers;
- Compactness and density.

The *Poa annua* plants have been categorised with seven distinct types identified (Table 5).

The *Poa annua* population varies from a very dense, compact, fine leaved plant that has very limited lateral spread and no seed heads to a more open plant, with coarse leaves and numerous stolons that exhibit strong lateral spread and large numbers of seed heads (Figures 4-9).

The seven categories of the *Poa annua* population are normally distributed as is maximum plant height. Maximum plant height is related to type in that Type 1 and 2 plants are the shortest whereas Type 6 and 7 plants are the tallest.

The *Poa annua* population would appear to have similar characteristics to those of bentgrass ecotypes in golf greens as observed by Sellar (2000). The variation in bentgrass types consisted of small, dense types with little spread and large, coarse leafed and aggressively spreading types that fill in vacant spaces.

Observations of the *Poa annua* types would indicate that there are variations from very dense types with little or no spread to large, coarse and aggressive space fillers. This variation provides an opportunity for *Poa annua* to colonise and persist in a variety of situations.

One-hundred-and-sixty *Poa* plants were collected from Commonwealth GC

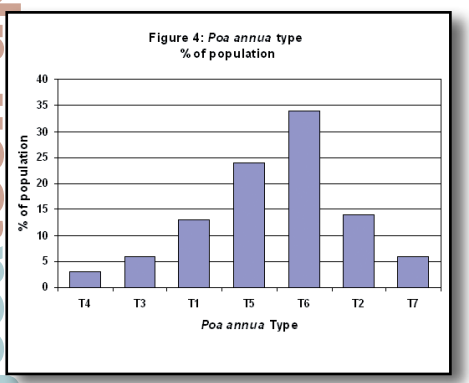
The majority of the *Poa annua* types are moderately dense to slightly open with coarse leaves and are strongly stoloniferous. However, there are two types with similar characteristics that are distinguished by the presence of seed heads. They either have no or occasional seed heads or produce numerous seed heads. The production of seed heads provides an additional opportunity for *Poa annua* to colonise/fill in bare spaces in bentgrass swards.

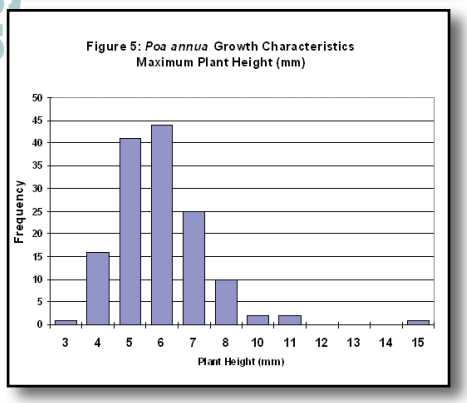
It is interesting to note that about 50 per cent of the population produce very few or no seed heads (Figure 8) indicating that the population is dominated by more perennial (var. reptans) types.

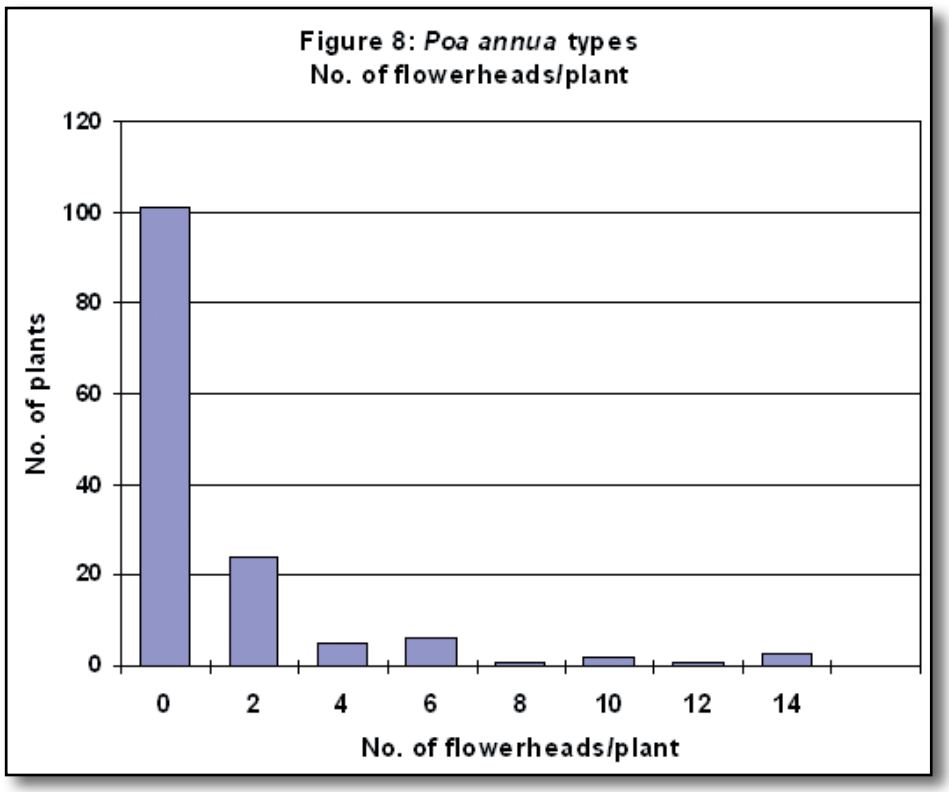
TABLE 5: VARIATION IN POA ANNUA TYPES COLLECTED FROM COMMONWEALTH GOLF CLUB

TYPES	DESCRIPTION	% OF POPULATION
Type 1	Dense, tight, short plant with fine leaves and no seed heads. Short or no stolons.	13
Type 2	Dense, tight, short plant with fine leaves and no seed heads. Medium stolon growth.	14
Type 3	Dense, tight, short plant with fine leaves. Seed heads present. Medium stolon growth.	6
Type 4	Dense, tight, short plant, "puffy growth" with coarse leaves. No seed heads present. Medium stolon growth.	3
Type 5	Moderately dense to slightly open, short plant with coarse leaves. No or occasional seed heads present. Strongly stoloniferous growth.	24
Type 6	Moderately dense to slightly open, short plant with coarse leaves. Large number of seed heads present. Moderate stoloniferous growth. Plant die-back occurs following flowering.	34
Type 7	Moderately dense to slightly open, short plant with coarse leaves. Large number of seed heads present. Strong stoloniferous growth.	6

BY JOHN NEYLAN AND ANDREW PEART



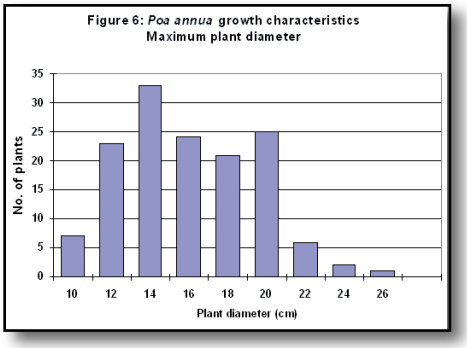


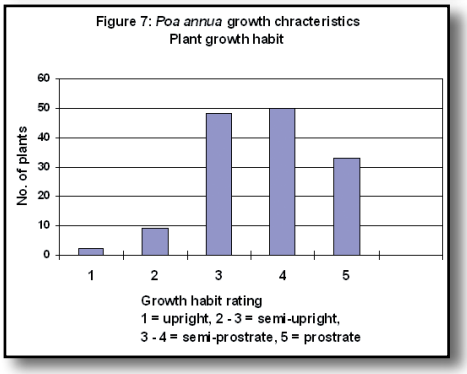


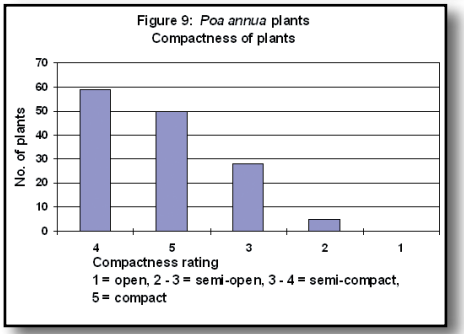
The seven ecotypes are being propagated for testing against various herbicides including propyzamide, endothal and paclobutrazol.

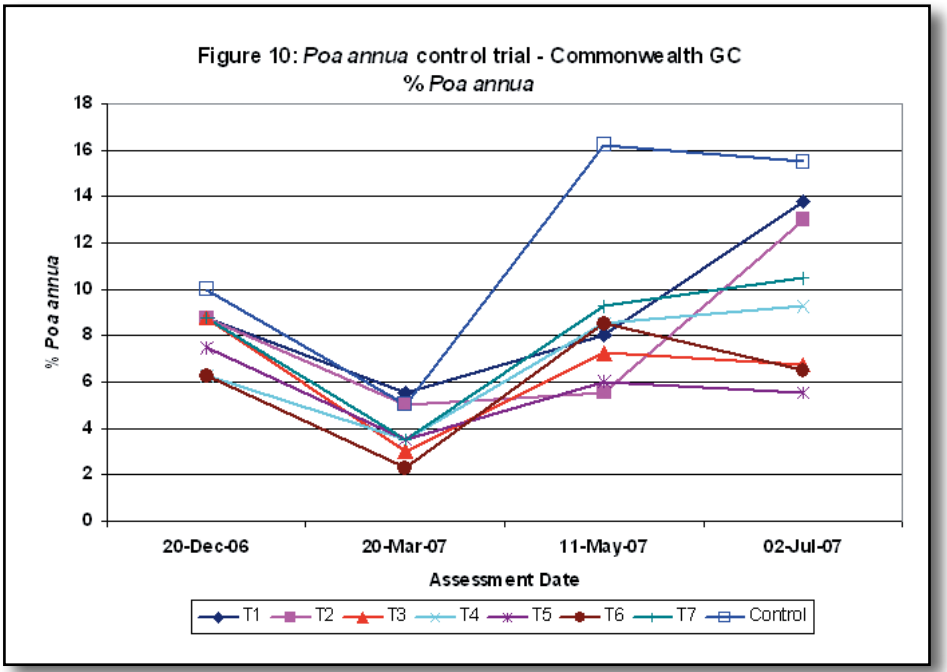
ACKNOWLEDGEMENTS

The AGCSA wishes to acknowledge the financial support of this project through Horticulture Australia Ltd and the co-operation of Mark Prosser (superintendent Commonwealth Golf Club), David Scaife (superintendent Bonnie Doon Golf Club) and Evergreen Turf. We also wish to acknowledge the assistance provided by Dr. Jim Hull (University of Sydney) and Bruce McPhee and Chisholm TAFE for assisting with the bentgrass trials. Thanks also to Dr. David Aldous (University of Melbourne) and Dr. Kenneth Marcum (Arizona State University) for the work done on the salinity trials.









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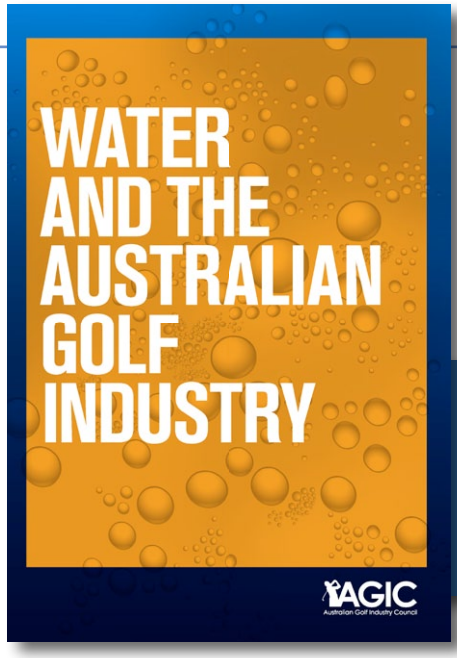
BY JEFF BLUNDEN AND BRETT ROBINSON



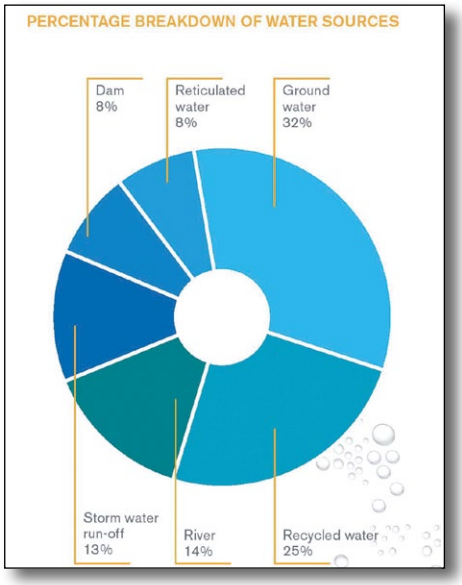
AGIC
Australian Golf Industry Council

The AGIC's recently commissioned "Water and the Australian Golf Industry" survey shows that the industry is a leader when it comes to efficent water use and an innovator in terms of its water management practices

AGIC unveils industry water document

In September 2006 the Australian Golf Industry Council (AGIC) was formed to represent the entire golf industry on important issues such as the current challenges surrounding water use and management. In its first official undertaking, the council has investigated golf course water use which it hopes will aid the industry in its quest to be seen as a leader and innovator in the area of water management.

Australia has experienced one of the most severe droughts on record. This drought has placed significant pressure on industries that have a heavy reliance on water and the financial sustainability of many businesses is now under threat. The golf industry and the many individual golf club businesses within it is one of those.



In order for the Australian Golf Industry Council (AGIC) and the golf industry to more accurately promote its case to relevant government authorities, research on the water use patterns of the Australian golf industry has recently been undertaken by Golf Australia and the AGCSA on behalf of the council.

This research, which has now been published in the document "Water and the Australian Golf Industry", seeks to understand the current water use patterns and the level of proactive industry action around water.

"The information provides the first detailed understanding of water use by Australia's golf courses and highlights the value of the golf industry to the Australian economy," the AGIC report says.

"Taking into account the likely future scarcity of water, the document clearly illustrates that the golf industry is already a proactive water manager, has been an early adopter of efficient water management practices and is a vital contributor to the wider Australian economy.

"With the value of the Australian golf industry being measured at approximately $2.71 billion, it is clear that golf is not just a Saturday afternoon recreational activity. It is a major contributor to the Australian economy, with each person playing the game having an equivalent value of about $2100 each.

"When measured as a value output against every megalitre of water consumed, the golf industry generates approximately $22,000 in output for each megalitre used, positioning it as a value producing industry in terms of water use.

"AGIC research has found that almost one third of golf clubs are currently under some type of water use restriction. These restrictions are having a serious impact on these businesses and therefore threatening the industry's health and contribution to the wider Australian economy."

A VAREITY OF SOURCES

The AGIC study found that there are about 1000 18-hole equivalent golf courses covering some 58,000 hectares in Australia that have some dependency on water for the irrigation of grass playing surfaces.

In total these courses use approximately 124,000M of water, an average of 124M megalitres per 18-hole equivalent course per year. Irrigated surfaces (20 per cent) receive an average of 10.7M per hectare.Ground water and recycled water accounts for almost 60 per cent of the water used.

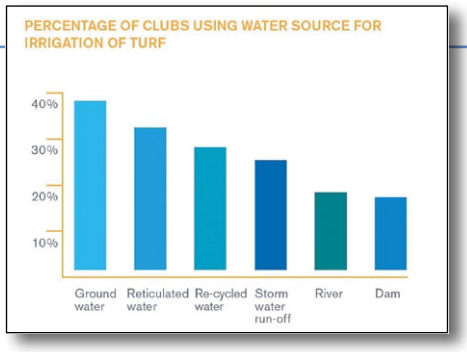
The study also found that about 60 per cent of golf courses across the country are currently using two or more sources of water and that only seven per cent of courses have 100 per cent reliance on reticulated water. Of that number, they use on average just 50M a year which is less than half the national golf club water consumption average.

"The Australian golf industry has been aware for a number of years of the impending crisis in relation to water and many golf clubs have already made significant investment in alternative water sources and water saving management plans," the report says.

"The industry realises it must be more responsible with the water it has and must continue to examine water use efficiency strategies. Many golf clubs are already committed to such strategies with evidence of this found in the AGIC research.

"The golf industry also acknowledges that recycled water, where possible, should be the preferred water source for turf management. However, greater support from the government will be necessary for this to be more broadly implemented."

The AGIC study found that over 40 per cent of golf clubs nationally have in place a formal water management plan (WMP) and two thirds of golf clubs either have or are currently exploring other water alternatives.



Access to recycled water plants and new bore installations are the most common alternatives being sort, followed by investigation of on-site recycling plants, new stormwater pipes and dam construction.

In addition to these long-term projects, golf clubs are also pursuing a number of other shorter term practices that deliver immediate returns in terms of water management practices. These include:

- Use of wetting agents (being used by 65 per cent of clubs);
- Less frequent watering (being undertaken by 59 per cent of clubs);
- Installation of more efficient irrigation sprinkler heads (being undertaken by 50 per cent of clubs);
- Changing to less water dependent turf types (conversion from cool-season to warm-season varieties), a water management practice occurring at about one third of golf clubs.

"In short, the industry is being very proactive towards minimising its water use," the report says. "The golf industry is also developing best practice water management strategies in the aim to 'drought proof' the industry for the future."

One of these new strategies set to be rolled out over the next 12 months is the AGCSA's Water Management Plan initiative. This will be a free service to all golf clubs which will provide the necessary tools to establish site-specific water management plans. The initaitve will go a long way to helping the industry be self sufficient in the long-term and will adopt a community-based approach to water management issues.

"Our message to government is that the industry requests a fair hearing around water, seeking acknowledgement of its efforts to date and requests greater support for the protection and further enhancement of the golf industry's value," the report says.

"The golf industry would like to work with government departments and water authorities to find the most appropriate long-term options for the sustainability of the industry.

"The industry is well advanced with modern water management practices and should be considered a leading and progressive industry with regard to water management. It also has significant value and is a major contributor to national employment."

For more information about the AGIC visit www.agic.org.au

BY BRETT ROBINSON

Cairns 2007 – 23rd Australian Turfgrass Conference Review

ATM looks back at the highly successful 23rd Australian Turfgrass Conference and Trade Exhibition which headed to Cairns for the first time back in July

Climate change, its impact on the wider turf industry and water management strategies were among the key topics examined in detail at the 23rd Australian Turfgrass Conference which was held at the Cairns Convention Centre from 22-26 July.

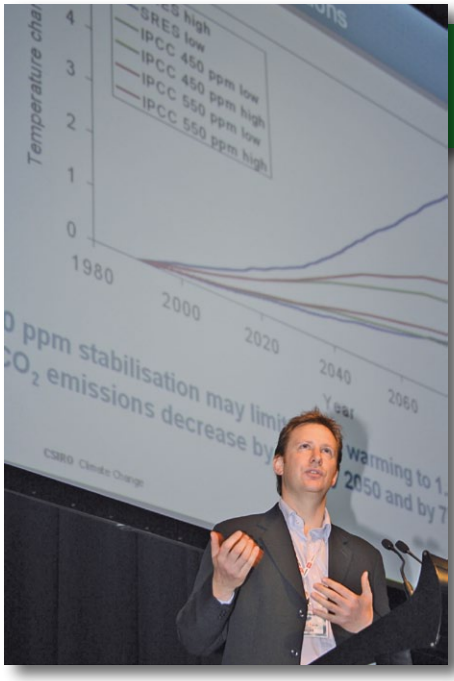
Over 300 superintendents and turf managers from around Australia and the Asia-Pacific region made the journey to far north Queensland along with over 200 representatives from 41 trade companies.

Despite some unseasonable downpours – perhaps a sign of climate change – the conference kicked off in style on Monday with the 2007 Toro AGCSA Golf Championships at Paradise Palms Country Club, while that evening around 300 delegates resplendent in Hawaiian shirts gathered at the impressive Cairns Colonial Club for the Bayer Environmental Science Welcome Reception.

Themed 'climatic conditions of the modern era', Simon Torok (CSIRO) and Mike Young (University of Adelaide) kicked off the education component of the conference on Tuesday morning with respective presentations on understanding the impacts of climate change and water management issues.

The new Workchoices legislation came in for some close scrutiny during Tim Greenall's presentation on how the new IR laws are impacting the turf industry. Not surprisingly, his presentation was one of the best attended sessions on the first day.

Other keynote speakers included the very popular Louise Barton (University of WA) and recently retired University of Melbourne water expert Geoff Connellan, while former Brisbane Golf Club superintendent Brett Morris teamed with fellow University of Sydney counterpart Jim Hull to look at turf management challenges in the 21st century.



Simon Torok kicked off the 23rd Australian Turfgrass Conference with a comprehensive look at the impacts of climate change

The education sessions split into the respective golf and sportsfield streams on Wednesday with Graeme Logan from Telstra Stadium kicking off the latter by looking at some of the challenges his facility faces on a weekly basis. The golf stream featured a variety of presentations from superintendents, including ex-pat Gary Chatfield who detailed the reconstruction of the Navy Golf Course in Thailand which was devastated by the Asian tsunami in 2004.

Ross Watson, Dean Scullion and Terry Muir gave a highly informative presentation into the environmental issues concerning the development of Kooindah Waters, while the likes of John Neylan, Andrew Peart (AGCSA), Don Loch, Matt Roche (QDPI&F) and Darren Moore (Lakelands GC) provided the industry with the latest turf trial updates and results.

On the final day of presentations, John Odell (The Royal Sydney Golf Club), Peter Frewin (Barwon Heads Golf Club) and Daryl Sellar (ex-Glenelg Golf Club) led a panel session on managing upwards, while the latter two combined with David Lunardelli (Brookwater GC) to highlight some of the innovative water conservation techniques employed at their courses to secure the future of their facilities.

"One of the main comments from feedback we have received was how much delegates enjoyed listening to their fellow superintendents present seminars on works they had undertaken at their course," says AGCSA events manager Simone Staples. "We will be taking that on board when we look at putting together the education programme for Melbourne."

The Syngenta-sponsored interactive seminars were both well attended which once again proved that the hands-on workshops are a winner with delegates. The workshops were conducted by Dr Henk Smith, Matthew Holmes (Syngenta) and Craig Day (Spray Safe and Save) who demonstrated how to maximise spraying efficiencies and getting the best out of spraying equipment.

The education component of the conference continued through to Friday with the post conference turf tour which visited three facilities. Around 40 delegates took part in the tour which kicked off with a visit to Tropical Lawns. Passionate owner Terry Anderlini took the group around his turf farm and discussed in detail the development of his new couchgrass greens variety Novotek which a number of golf clubs in the Cairns area are looking at converting across to.

Cazaly's Stadium was the next venue

where curator Rod Cade outlined some of his management challenges in looking after the region's premier AFL venue, while the final stop of the tour was at Paradise Palms Country Club where superintendent Paul Earnshaw ran through some of the major works the course will undergo in the next couple of years.

TRADE EMBRACE EXHIBITION

The 23rd Australian Turfgrass Conference Trade Exhibition again acted as the backbone of conference week with 41 exhibitors making the journey to Cairns including a number exhibiting for the first time (Golflinx, Hydrosmart, Safe Tees Down Under and Velvetene).

The queues at the e-par computer lab, run by Terry Muir and Dean Scullion, demonstrated that environmental management was at the forefront of many delegate's minds, while the Globe crew got into the tropical theme with their colourful booth set-up.

A number of companies launched new products – Bayer Environmental Science launched its popular turf and ornamental technical manual – during the two days with many companies reporting excellent business.

Over 40 companies attended the 2007 trade exhibition

"The smaller format continues to be well received by the trade and we had some excellent feedback in terms of this year's location," says AGCSA joint general manager and trade exhibition organiser Scott Petersen.

"The general feedback was that most said it went better than they had expected which is encouraging. The regional conferences are designed to be more informal and rather than just being part of the trade show we hope exhibitors can be a part of the whole conference week experience."

GOLD CREEK CLEAN SWEEP

The 2007 Toro AGCSA Golf Championships will go down on record as one of the toughest in the event's history with just two players managing to break 80 on a very tricky Paradise Palms Country Club layout. Superintendent Paul Earnshaw had the course in superb condition (despite the best efforts of vandals who had taken to the fifth green with a car) and his prediction that the course would provide a true challenge for his turf management colleagues certainly rang true.

Defending champion Steven Jacobsen probably knew what was ahead and wisely pulled out on the day after contracting a bug which had him bed ridden for the opening days of the conference. As it transpired, eventual champion Scott Harris from Gold Creek Country Club lifted the trophy after posting ▶

Gold Creek's gun golfers Scott Fogg (stableford winner) and Scott Harris (stroke winner)

the highest winning total since 2001, while the winning stableford score – 31 – proved just how much the entire field of 88 struggled to get to grips with the course.

Despite the difficulties, the day did create a little slice of AGCSA history. Harris became the first winner of the Toro AGCSA Golf Championships from the ACT and remarkably it was his assistant Scott Fogg who took out the stableford prize to make it a clean sweep of the major trophies for Gold Creek.

Harris fired a five-over par 77 to collect the Toro Red Jacket, six shots ahead of two times winner Trevor Ridge from Sawtell Golf Club. After a front nine which saw him post bogies on holes three through seven, Harris steadied the ship to fire an even par back nine, which included a birdie on the par 4 13th.

Ridge finished runner-up on a countback from Brent Hull (Moruya Golf Club) after both shot 83, while fellow Red Jacket winner Anthony Toogood (Commercial Club, Albury) joined Allan Devlin (Secret Harbour Golf Club), Allan Horrocks (Dubbo Golf Club), Matthew McLeod (Tocumwal Golf Club) and Scott Balloch (Eagle Ridge Golf Club) in posting 84.

While Harris was a clear winner in the stroke, Fogg had to work pretty hard to prise the stableford trophy from defending champion Ryan Fury (Eastlake Golf Club). Fogg actually fired the second best round of the day – a 78, one more than his superior – to finish with 31 points, the same as Fury who plays off 20.

On a countback it was discovered that both Fogg and Fury had scored identical front and back nines – 13 and 18 points respectively – so the trophy was decided on the last six holes with Fogg edging Fury by a single shot. Fogg's round included two birdies on the par 4 14th and par 5 18th.

Fury didn't walk away from Paradise Palms empty handed, however, and his 31 points anchored the NSW team which secured the state teams championship for the sixth time in eight years. Fury joined Ridge (29 points), Horrocks (29 points) and Cabramatta's Craig Wright (29 points) to post 118 points to finish well clear of WA.

At the other end of the field Wayne Marland (Port Kembla Golf Club) had a long day, managing just 14 points (back to back sevens) which included an impressive 10 wipes. Simon Bigg, who made the journey to Cairns from Norfolk Island, didn't fare much better, posting 10 points on the front nine and then just five on the back nine for a total of 15 points.

Hard luck story of the day had to go to AGCSA Excellence in Golf Course Management Award winner Darren Wilson. The Wembley Golf Complex superintendent was on track for the stableford title with 19 points on the front nine, however six scores of six on the back nine saw him come home with just eight points for a total of 27.

Across at Half Moon Bay Golf Club, Stuart Miller from Living Turf posted 41 points to take out the 2007 AGCSA Corporate Cup. Miller, playing off a 19 handicap, was one better than Ashley Peel from (Turf Irrigation Services) who finished second on a countback from Mick McMahon (40 points).

CAN'T TOUCH QUEENSLAND

After a couple of years' hiatus the Scotts Touch Rugby Competition made a welcome return to the conference. Four teams – Queensland, NSW City, NSW Country and the Scotts All Stars – lined up to do battle at the Cairns Touch Association and it quickly became apparent that the host state was the team to beat.

Despite losing Lazlo Boros early on with a hamstring injury, the Maroons swept all aside to claim the title after downing NSW Country in a hotly contested final 2-1. In the plate final the Scotts All Stars capped off a fine afternoon by failing to score a single try, going down to NSW City.

The winning Queensland team was: Boros, Steve Buttigeig, Matt Roche, Mitchell Sherwood, Brian Cox, Shaun Cross, Mark Hooker, Dean Reeves and Jeff Gambin (coach).

ODELL ELECTED TO BOARD

The Royal Sydney Golf Club superintendent John Odell was elected to the AGCSA Board following the association's annual general meeting held at the Cairns Convention Centre.

Odell, who will notch up 20 years at the exclusive Sydney course in February 2008, replaces long-time friend and fellow NSW superintendent Martyn Black who stood down from the board after four years' service.

Odell joins AGCSA president Jeff Gambin (Gold Coast Burleigh Golf Club), Pat Pauli (Horton Park Golf Club) and Allan Devlin (Secret Harbour Golf Club) on the board. Pauli was elected to the board for a further year while Devlin was appointed for a second two-year term.

MELBOURNE 2008

The 24th Australian Turfgrass Conference and Trade Exhibition heads south to Melbourne in 2008 and will be held from 21-26 July at the Melbourne Convention Centre.

In the weeks following the Cairns conference the AGCSA sent out a delegate survey asking for feedback about the Cairns gathering as well as suggestions for future conferences. AGCSA events manager Simone Staples says there has been some terrific feedback to date and this will be taken on board with plans now underway to compile the education sessions for Melbourne.

The survey also asked for feedback on future regional conference venues with Tasmania, Fremantle, Alice Springs and Darwin emerging as possible venues for the 2009. The AGCSA will assess each venue and will announce the final outcome in due course.

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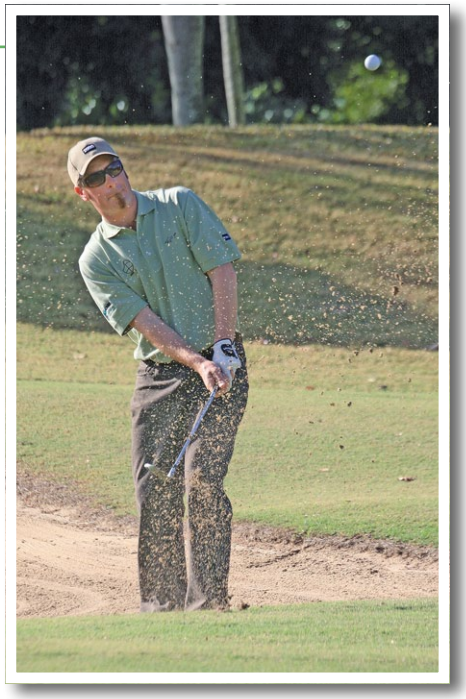
Conference Converges

The Australian Turfgrass Conference headed to Cairns for the first time and despite some unseasonably wet weather over 300 delegates converged for the turf industry's biggest annual gathering. Paradise Palms Country Club (pictured) teed off conference week by hosting the 2007 Toro AGCSA Golf Championships and it proved a tough proposition for the entire field with only two players shooting under 80 on the day.

Simon Bourne mulls over his putt

Colour was the order of the night at the Bayer Welcome Reception

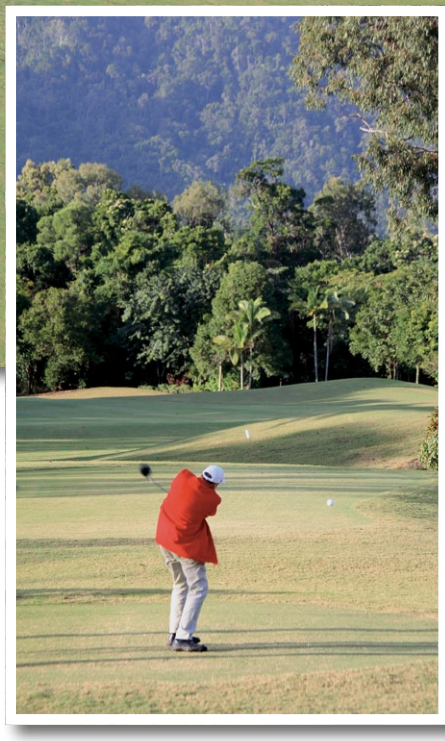
on Cairns



Above: Shaun Cross makes his escape on the 17th at Paradise Palms

Below: AGCSA Corporate Cup victor Stuart Miller from Living Turf

A tight fit for Red Jacket winner Scott Harris



Above: The 2007 Toro AGCSA Golf Championships officially tee off

Right: NSW Country 'coach' Pete George remonstrates with the refs during the Scotts touch competition

The Gambins carve up the floor during the Syngenta President's Dinner

2007 AGCSA Award winners (from left) Stuart Moore, Reg McLaren, Darren Wilson and Peter Beach

Trade Embraces Cairns Exhibition

Above: Blacky proudly displays his inside thongs

Right: Terry Anderlini from Tropical Lawns

Getting up close and personal at Tropical Lawns

The smaller regional format of the conference proved a hit with the trade in 2007. Over 40 companies attended the two-day trade exhibition which acted as the backbone for the week in Cairns.

Above: Dean Scullion preaches the e-par philosophy during the trade exhibition

Below: Brendan Warby goes on the attack during the Scotts touch competition

Norm Ashlin checks out Hunter's latest range

The AGCSA board and staff weren't too hard to spot during the week

BY BRETT ROBINSON

2007 AGCSA Distinguished Service Award Winner Reg McLaren

On the final night of the 23rd Australian Turfgrass Conference four industry practitioners were honoured as part of the 2007 AGCSA Awards. To conclude this review on the Cairns gathering, ATM pays homage to the latest batch of award inductees – Reg McLaren, Darren Wilson, Stuart Moore and Peter Beach.

2007 AGCSA Awards Honour Industry's Finest

AGCSA DISTINGUISHED SERVICE AWARD Scotts

Presented in partnership with Scotts

Winner: *Reg McLaren*

"A hard, arduous life but one that was ultimately very rewarding". That is how 2007 AGCSA Distinguished Service Award winner Reg McLaren describes his 40-plus years in the Australian turf industry. It was a time of immense achievement marked ultimately by some great personal suffering, but now as he nears 75 years of age McLaren can look back and reflect that at the end of the day an industry he loved is all the better for his efforts.

"To win the award is quite out of the blue," McLaren told ATM magazine on the eve of receiving the award. "It was a complete surprise to get the award and I think it would have surprised a few others out there. I think they probably thought I was dead!

McLaren was always destined for a life in horticulture. His father was a parks superintendent and his three brothers all went down the horticulture route as well. McLaren started as a trainee with the Concord Council at the age of 14 in 1946. After a couple of years there he moved across to Concord Bowling Club, which saw his pay jump from two pound a week to six pound a week.

McLaren's first job on a golf course came in the late 1940s and early 1950s at The Australian Golf Club before he shifted across to Concord Golf Club. In 1957 he moved out to Sydney's western suburbs where he took over as head curator of Cumberland Golf Club, a position he would hold for 11 years.

"I always hungered for knowledge because I didn't have much schooling," recalls McLaren. "Our family moved around a lot due to dad's job as a parks superintendent and I think in my final six years of school I went to six different schools.

"After the war too there was no one trained to teach young blokes coming through as they were all trying to get their lives back, so I made sure I got in contact with some of the leading guys in the profession to learn from them."

After finishing at Cumberland, McLaren headed back to Concord as course manager and it was at this time he became president of the NSW Curator's Association (later to become the NSW Superintendents Association) after previously holding the office of treasurer and vice-president. McLaren would reign as NSW president twice for a total of nine years and in total served 20 years on the committee. At the 2002 NSWGCSA AGM at Ryde Parramatta Golf Club he ws made a life member in recognition of that service.

"We worked damn hard to keep our

association together and develop it and I would often spend a couple of days a week keeping it running," says McLaren.

"Back then we weren't treated very well by the golf clubs who thought we were mere labourers. But we were very brainy people who possessed a lot of knowledge and it's great to see today where the industry has come and to see these blokes recognised as they should be. I think that had a lot to do with our attitude and perseverance as an association back in our day."

McLaren rates his greatest achievement as the construction of Liverpool Golf Club. Having left as course manager after a difficult period at Concord, McLaren was approached to take over the construction job at Liverpool, a position he took up in late 1970.

"I had to get the course up by June-July the following year and I remember when I got there the course was wall-to-wall paspalum a couple of feet high – it was like wheat! I had been playing around with a new chemical and had done some trials so I blanket sprayed the whole course three times (10 pound to the acre over a three week period) and within a month or two I had couchgrass from boundary to boundary. People couldn't believe it and I couldn't believe it myself!

"I hydro-sowed the greens too which was pretty new back then. Before sowing the greens we had some issues with the soil pH so I took samples from all 18 greens in buckets and trialled different rates of lime on them. We ended up having 18 perfect strikes and the bentgrass greens were some of the best in the state. The course went on to host three major tournaments in the mid-1970's including the Australian PGA.

A PESKY LITTLE PEST

Reg McLaren was one of the first superintendents to document the outbreak of Argentine stem weevil in NSW as well as New Zealand. The following are some of McLaren's recollections of the first sightings of this pesky insect.

"In the early 1960s there was a lot of talk about a problem with a bowling green at Wollongong RSL Club. Charlie Crews, curator of Cronulla Golf Club, and a few friends went down to take a look at this phenomenon and reported back to our state association. The green looked as though it was on 'fire' with a distinct pink to reddish tinge all over. Soil was tested from the green as it was thought to contain some impurities, but no problem was noted.

The next problem was noted at Clovelly Bowling Club and it was identified as a weevil and as such called the 'Clovelly weevil'. For quite some time after this, nobody would accept the fact that they had this problem and I was one of them.

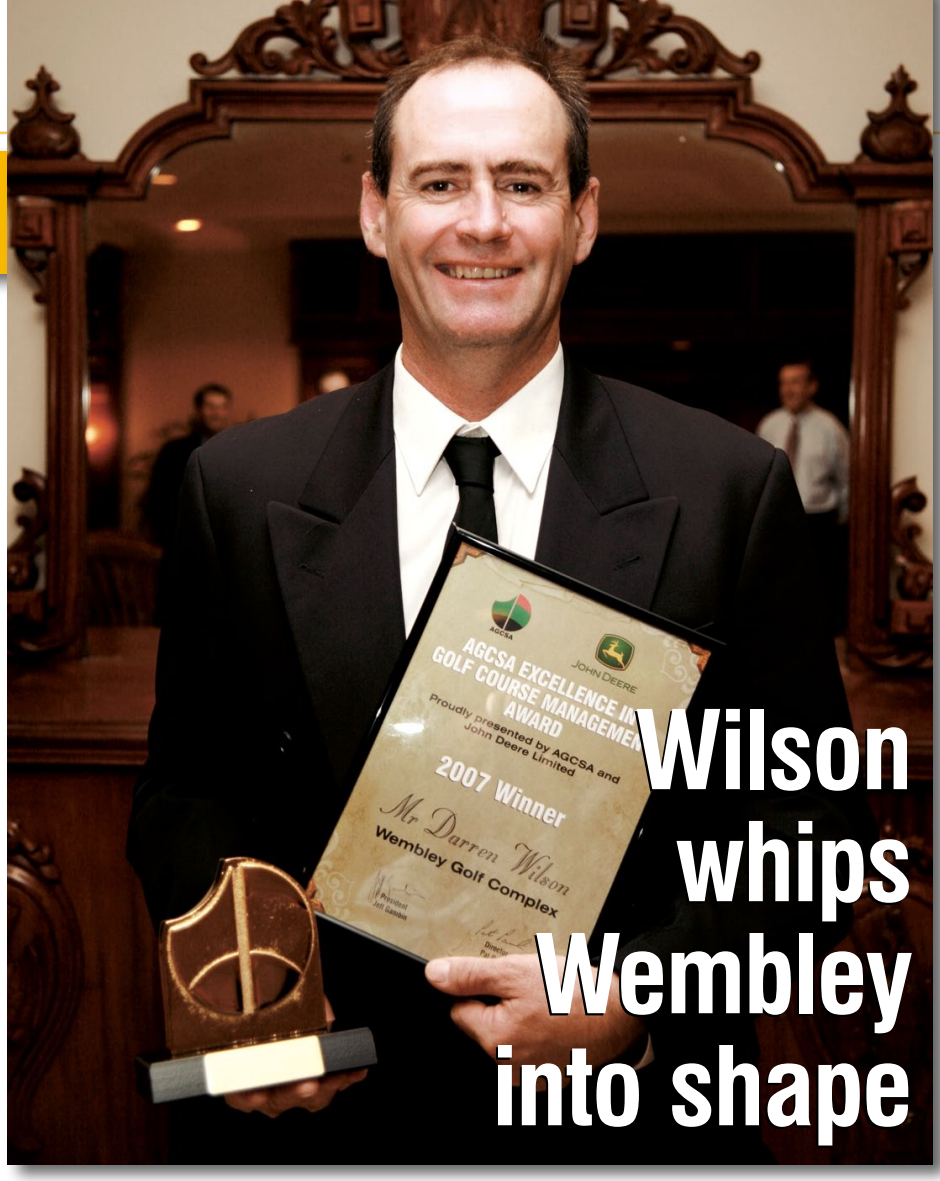
In 1966, the 6th green at Cumberland Golf Club started to thin out and I called upon Dermott Reilly from Amalgamated Chemicals to come and have a look. When we were about one hundred yards from the green, he stated that he thought that by the pink colour of the green that there could be an infestation of weevil. On inspection he was correct.

By this stage, the weevil had been formally identified as Argentine stem weevil and came from New Zealand. Some said it must have swam across or flew to Clovelly Bowling Club, but in fact it was found to have been transported across in ryegrass seed imported from the 'Shaky Isles'.

As time passed, the problem was becoming more widespread and during a very bad drought in 1967 the fairways at Cumberland were pink all over and the weevils became rampant. We first started treating them with Dieldrin and Clordane, but the weevils seemed to become more immune to each chemical we used. We had our best results with a chemical called Twin Spray, a mixture of DDT and DDD. Success was had by using Malathon and then later Diazanon 80.

In 1972, I was invited to attend the first turf conference of the New Zealand golf greenkeepers association held in Rotorua. At first, I was given a cold reception and held at arms length until walking down a fairway at Tauranga with greenkeeper Grant Sylvester. He told me of the problems with the approaching green stating he had treated for helminthosporium and pythium to no avail. I noted the familiar pink colouration and told him I thought it could be weevils. All he could say was "bullshit". On reaching the green, I found plenty of the little devils.

Before returning home from New Zealand in 1972, I had found many weevil infestations in golf greens, including Matamata, Manukau, Pukekohe and it was noted that photographs in a book I had purchased called 'Great Golf Holes of New Zealand" showed most greens had the same problem!"



2007 AGCSA Excellence in Golf Course Management Award recipient Darren Moore from Wembley Golf Complex

Wilson whips Wembley into shape

AGCSA EXCELLENCE IN GOLF COURSE MANAGEMENT AWARD

Presented in partnership with John Deere

Winner: *Darren Wilson (Wembley Golf Complex, WA)*

Western Australia's proud record remains following Darren Wilson's success in collecting the 2007 AGCSA Excellence in Golf Course Management Award, presented in partnership with John Deere. WA superintendents have won this award three times since 2000 and Wilson follows in the footsteps of 2004 winner Idris Evans (The Western Australian Golf Club) and 2000 recipient Allan Devlin (Secret Harbour Golf Club).

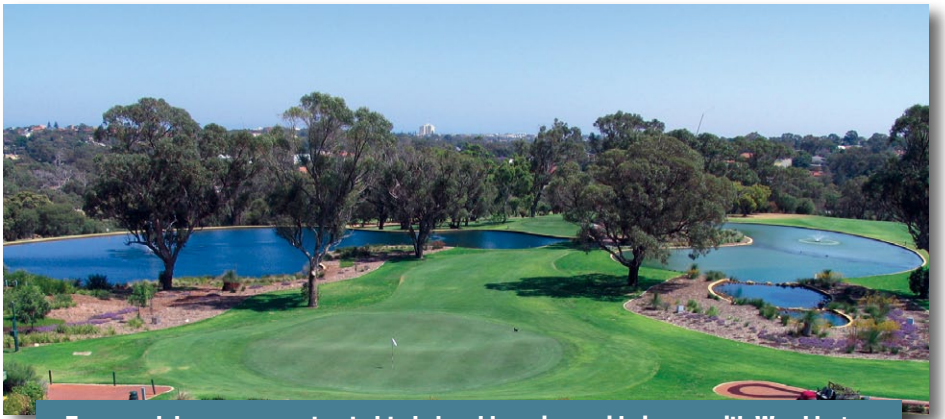
In just four-and-a-half years as superintendent at the Wembley Golf Complex in Perth, Wilson has turned this once flagging 36-hole public facility into one of the busiest and most respected public layouts in the state. During that time Wilson has overseen the complete overhaul of the complex's irrigation system as well as undertaken major improvements to both 18-hole courses.

Wembley Golf Complex is a 36-hole public facility about eight minutes from the Perth CBD. Located on 122 hectares of land, it is owned and maintained by the Town of Cambridge. The complex opened in 1932 and also has a 30-bay driving range and tavern. It is one of Australia's busiest golfing facilities and averages around 168,000 rounds and 56,000 buckets of balls per annum.

Wilson began his working life as a trained motor mechanic before moving to Lake Karrinyup Country Club as mechanic in 1990. As he became involved in assisting groundstaff with daily mowing, Darren decided to learn more about turf management through Murdoch TAFE. He completed in two years the Certificate of Turf Management attending after hours classes and was awarded the Baileys Shield as the best night school student.

After rising to 3IC he left Lake Karrinyup in 1996 to work for the Perth distributors of Jacobsen, but after a period of 18 months was back in the greenkeeping trade as assistant superintendent at The Vines Resort.

During his time at The Vines Wilson was heavily involved in a number of Heineken Classics, and he also completed his Masters degree by correspondence with Dr Peter Martin at the University of Sydney. His thesis was on drought tolerance of forage and turf tall fescue cultivars.



Two new lakes were constructed to help address iron oxide issues with Wembley's groundwater supply as well as enhance the amenity of the complex

WILSON'S WAY

Wilson made the step up to superintendent in November 2002 when he joined Wembley Golf Complex. He was employed by the Town of Cambridge with the aim of regenerating the two golf courses that were in a poor condition.

The problems were numerous and included an ageing reticulation system with five control zones, which was costing an average of $120,000 per annum to keep running. On the course the kikuyu fairways suffered significant decline over the summer months and hadn't been renovated for the best part of 10 years.

The greens too were heavily infested with

Thirteen tee complexes were reconstructed as part of the Wembley overhaul

foreign grasses, had unsatisfactory thatch levels and were poorly designed. Tee banks were also too small to cater for the significant amount of traffic the course received, while there were heavy infestations of Parramatta grass on both courses.

Wilson's priority upon starting was to rectify the irrigation issues. Together with the general manager, Wilson was able to convince the Town of Cambridge to replace the entire system after many years of delay. Wilson was project superintendent for the entire job which cost a total of $2.8 million.

The main objectives of the new system were to significantly reduce the amounts of iron oxide present in the groundwater; ability to monitor water drawn from bores and irrigation; ability to water areas of turf as required with valve-in-head sprinklers; the construction of two new lakes as a feature as well as for the reduction of iron oxide levels; and new mainlines and laterals.

Total Eden was appointed to install a Rain Bird Cirrus controller system with Rain Bird Eagle valve-in-head sprinklers using decoders, two new lakes, new mainlines and pump station. Work started in May 2004 with lake construction and mainline installation.

The brief was to maintain as much of the old system in working order while installing a new system, and this as expected presented many problems. The brief also stated that as much of the golf course should remain open as possible to limit the loss of green fees. As ▶

a result, only the holes being worked on were closed for installation.

In June 2005 the new system was commissioned. Its key features include:

- Two new lakes which have significantly enhanced the amenity of the complex. Three holes of the Tuart Course now have water in play;
- New bore and irrigation mainlines;
- Valve-in-head sprinklers for greens, tees and fairways. The watering window has been reduced from nearly 12 hours to approximately eight;
- New pump station with a capacity of 180-litres per second;
- Real time monitoring of the pump station available at the golf course depot;
- Replacement of all bore cabinets;
- Fertigation unit at pump station;
- Installation of three separate rain buckets, linked back to the weather station; and
- Monitoring probe down a bore to measure groundwater levels; and
- Iron oxide levels have decreased from 4ppm to 0.1ppm.

GOLF COURSE IMPROVEMENTS

When Wilson started at Wembely, the full-time staff of six were lacking expertise, had little input into the progress of the golf course and relied heavily on contractors to complete basic maintenance work. This has changed dramatically and the staff of 12, including the Town's first apprentice, is expected to contribute and learn.

Design and construction of new greens, tees and bunkers is now all done in-house. Importantly, relationships with pro shop staff and management have also improved greatly which is vital when maintaining a busy public golf course.

Considerable work has been done to improve the condition of both courses including the replacement of nine greens and redesign of 13 tees, the addition of native garden beds in non-play areas, reshaping existing bunkers and addition of 18 new bunkers. New concrete and paved paths were constructed to replace the old wood chipped paths, while trials started with staff to assess the suitability of fluoproponate to control Parramatta grass.

In November 2004, the golf course received council endorsement to start the development of an ISO 14001-compliant environmental management system (EMS). Wilson has been heavily involved with this process and when completed the EMS will cover all activities within the boundaries of the golf course. Wilson is now completing the EMS using the e-par system.

Significant work completed as a result of the EMS includes new wash down bays, new fuel and chemical storage, tree health survey, bush regeneration programme and bird count.

Outside of the course, Wilson has been a board member of the Golf Course Superintendents Association of WA (GCSAWA) for the last three years and at the August AGM was elected president.

Wilson also sits on the health and safety and EBA committees for the Town of Cambridge, and has played an active role with the kikuyu research project being carried out by the University of WA. He also lectures on turf subjects at Murdoch TAFE.

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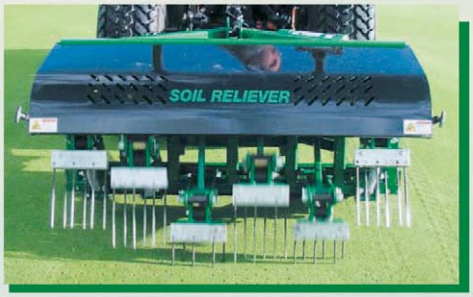

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2007 AGCSA Claude Crockford Environmental Award winner Stuart Moore from Southport Golf Club

AGCSA CLAUDE CROCKFORD ENVIRONMENTAL AWARD

Presented in partnership with Syngenta

Winner: *Stuart Moore (Southport Golf Club, QLD)* syngenta

Southport Golf Club superintendent Stuart Moore capped off a fine six months by winning the prestigious Syngenta-sponsored AGCSA Claude Crockford Environmental Award in Cairns. The honour comes on top of Moore receiving the Superintendent Environmental Award at the Queensland PGA conference earlier in the year.

Super effort means a Moore sustainable Southport

In recent times Moore has overseen some dramatic environmental improvements to the club's maintenance facility, including the installation of a dedicated water treatment system, machinery washdown bay and chemical storage and mixing area. It took three years of convincing the club to commit to the improvements but Moore persevered and now has a facility which is the envy of many.

Southport Golf Club is situated on Queensland's Gold Coast. Its boundaries are adjacent to main thoroughfares, one of which is directly behind Chevron Island, located immediately west of Surfers Paradise beach less than two kilometres away.

As a result of the location it is linked to the Nerang River via tidal creeks running in and around the golf course. Due to this location any works, whether redevelopment on course or, as in this case, a washdown bay, come under stringent screening by authorities.

The objective of the project was a focus on installation of a functional, practical and reliable washdown bay to eliminate the use of potable water at the then existing washdown site, as well as control contaminants and waste. In addition it had to be approved by the relevant authorities but at the same time offer another service to members. Work began in September 2005 and by year's end the club had not only accomplished its objective, but also gained positive, if unexpected, bonuses along the way.

Moore had been pushing for almost three years for the project to start, but cost was always the major factor confronting the club board. However, with the Warringah incident and a letter to the board from a concerned member who was aware of the inadequacies of the then current facility, the club soon realised its environmental obligations and gave the $100,000 project the go-ahead.

DESIGN AND HARDWARE

Priorities that had to be addressed included:

- Use of the existing washdown bay site;
- Removal of town water from site;
- Contamination from machinery (residues etc.), waste clippings, spray units including tanks and backpacks to be prevented from making its way into environmentally sensitive ponds and waterways through the course;
- All waste material to be collected and re-used on course (e.g.; as mulch in gardens and waste hazard areas);
- Provision of space for two or three pieces of machinery to be washed down at the same time without standing in water, thus avoiding staggered return times for washing down and allowing machinery to stay on course for as long as allocated;
- Provision of a set-down point for all hazardous goods, including emergency

bunding in case of incidents (no incidents recorded thus far);

- Provision of a platform for a fuel filling station for bulk deliveries and daily refuelling of machinery;
- Inclusion of a storage facility for used chemical containers and readily accessible for collection;
- Use of machinery shed roof for rainwater harvesting to combine with the treated recycled water.

TREATMENT SYSTEM

The set up of the old washdown area was not dissimilar to that of many clubs like Southport. It had a typically open, flat area of asphalt, concrete and roadbase located next to a spoon drain that took all waste water directly into an adjacent pond linked to water hazards which eventually made its way to the Nerang River and Gold Coast Broadwater. This was unacceptable.

The treatment system devised for the new washdown bay had to firstly convert the Class B water (received from the Gold Coast City Council to irrigate the course) to Class A recycled water which was then transferred to storage tanks. In the tanks the Class A water is diluted with stormwater collected from the maintenance shed roof.

Achieving Class A standard was the only way of legally using recycled water, and necessitated installation of a primary treatment plant on the washdown bay to take irrigation water from the adjacent 12th fairway and deliver it to the system.

At that time the system capable of this process was the PASS (particulate air separation system) process water treatment system designed to treat approximately 5500 litres/hour. This means the water treatment process would always be drawing water from the Class B irrigation line. This water is directed to a break tank post-treatment, and then pumped into two rainwater tanks. An automatic valve opens and closes depending on water requirements.

Within this process, water is pumped via a recirculating pump through a chlorine mixing and contact column, then through a foam fractionator where a foaming agent and air/ozone mixture is introduced. The end result is Class A water which is constantly recirculated within the break tank allowing monitoring and reliable results.

The second part of the treatment system processes the waste recycled water once machinery has been cleaned. The waste water runs into a specifically built 'beach pit' below the washdown area where a separation screen captures almost all clippings and debris. The water passes through this screen and into a sump.

From here the WaterStax system takes over, pumping the waste water from the sump into separate tanks to be treated with bioremediation to reduce hydrocarbons. A manifold in the catch basin controls the flow of water over a grass catcher screen and at the same time recirculates a portion of the water back into the sump. This keeps most of the solids suspended and reduces the need to shovel sludge from the bottom of the sump.

Sand and grit separate from the water in chamber one. Bioremediation occurs in chamber two as the water flows through a biofilter, then through a manifold which draws off the bottom of chamber two and into chamber three, which is the final holding tank. After the microbes have had time to degrade the hydrocarbon contaminants the water is discharged to waste. Each chamber is aerated to control odour.

The bioprocess is simply a specially designed layer of biological media that create an ideal breeding ground for aerobic bacteria to quickly multiply and consume hydrocarbon-based contaminants, converting them to harmless H_2O and CO_2.

FIT FOR PURPOSE

As well as having a fit for purpose water resource, the club has made significant savings in its town water usage (up to 8M per annum) which is invaluable considering the current Level 5 water restrictions.

Also, as a direct result of extensive waste water treatment the lower waterways and ponds on the course have cleaned up, resulting in an increase in frog numbers and more prevalent turtle and birdlife activity. Members are also happier, as the once pungent odours that prevailed in this area have disappeared.

Aside from winning a state and national award for the project, the groundstaff at Southport now enjoy a facility that allows them to become more efficient when cleaning hazardous equipment through being able to perform such work in a safe and contained environment. All groundstaff have attended recycled water management training through which all have become recycled water accredited users.

As an unexpected benefit, Syngenta's Sam Hole announced at the awards ceremony that his company would also fund the set up and installation cost of the e-par environmental management system for Southport GC in recognition of Moore's efforts in improving the environmental management of his facility.

Beach graduates with honours

AGCSA GRADUATE OF THE YEAR AWARD TORO

Presented in partnership with Toro

Winner: *Peter Beach (Gosnells Golf Club, Perth, WA)*

Gosnells Golf Club's Peter Beach completed a fine conference week for Western Australia by collecting the 2007 AGCSA Graduate of the Year Award, presented in partnership with Toro. Beach becomes the second WA recipient of the award in four years, joining Craig Webley (Lakelands Country club) who won the award back in 2004.

Beach beat home a strong field of representatives from Victoria, Queensland, New South Wales, ACT and South Australia to win the national award and for his efforts has won a trip to the USA, courtesy of Toro, to attend the Winter School for Turf Managers at the University of Massachusetts. Earlier in the year Beach was named the GCSAWA's 2006 Best Indentured Apprentice.

2007 AGCSA Graduate of the Year Award winner Peter Beach from Gosnells Golf Club

Beach currently works at Gosnells Golf Club in Perth under GCSAWA immediate past president Brad Sofield who he also worked with when first starting his turf management apprenticeship at Melville Glades Golf Club. Over the years Beach has become an integral member of the Gosnells crew and has risen to become a senior greenkeeper in charge of a number of areas.

As a senior turf manager Beach supervises weekly weekend overtime shifts and prepares the course for competition and tournament play. He is also involved in the introductory training of junior staff and is also the authorised Gosnells safety officer.

Currently nearing completion of his Certificate IV in Turf Management, Beach plays a significant role in the creation and monitoring of the club's environmental management system and is a key figure in the management and maintenance of the irrigation system.

A handy golfer (he plays off an 11 and is a member of Royal Fremantle Golf Club), outside of work Beach is also an accomplished drummer (watch out Ben Tilley) and is an active member a community theatre group.

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AGCSA BEST PRACTICE SERVICE TO AID SUPERS AND CLUBS

The Australian Golf Course Superintendents' Association (AGCSA) has launched an innovative new service for all golf clubs in Australia to help improve best management maintenance practices.

Headed up by award winning former Glenelg Golf Club superintendent Daryl Sellar, the AGCSA's best practice service will provide golf clubs with a detailed overview of their course and its maintenance requirements, with the ultimate aim of improving course standards and increasing member/player satisfaction.

"Many courses have surveyed their members about their course and what is clear is that the improved quality and condition of the golf course means increased player satisfaction," says AGCSA joint general manager Scott Petersen.

"Golf clubs in Australia are fighting over the same market share of players and quite often player choice of course will come down to the quality of surfaces provided. With that in mind clubs that are experiencing budgetary pressures shouldn't focus on course maintenance cuts but rather look for resources to increase the quality of their course presentation."

The AGCSA best practice service will be flexible in structure and adapted for each individual club's needs. Some of the tools and analysis include;

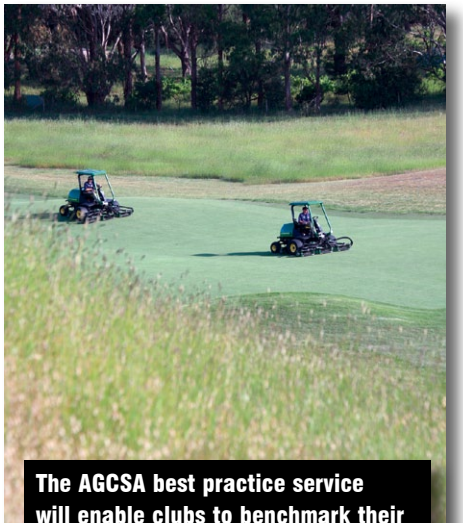
- Annual course maintenance programme. A spreadsheet designed to provide a desktop view of annual maintenance and events;
- Man hour allocation by task and day and man hours by task. Two different ways of viewing the use of HR, with the first being effective in helping the superintendent to identify the disparity between maintenance requirements and available man hours, and the second helpful in planning essential weekly maintenance and identifying time opportunities for special projects.
- Stock and application costs. Helps illustrate maintenance costs/area in detail to identify/manage the implications of budget alterations. Can assist in product selection by criteria of purpose, safety, rotation, cost or whatever the priorities may be.

The service is designed around working with the superintendent and management to analyse, prioritise and make recommendations in regards to maintenance practices to improve course quality. The service will provide the club a positive direction in which to focus maintenance practices which will in turn have a positive bearing on member satisfaction.

New AGCSA HR and best practice manager Daryl Sellar

The service, coupled with AGCSA's HR service which Sellar is also heading up, will provide superintendents with a number of tools and programmes to improve their maintenance operations both on and off the course.

"The superintendent at the conclusion of the service will be able to clearly demonstrate to board and management a detailed audit of the course maintenance, the allocation of man hours and budget strategy so that both the superintendent and management can make informed and measured decisions that will impact on the course quality and condition," says Sellar.



The AGCSA best practice service will enable clubs to benchmark their maintenance operations

"The best practice service can also analyse and recommend OH&S, environmental management and HR practices. At the end of the day it will be able to provide benchmarking for course maintenance."

Sellar, who joined the AGCSA as HR and best practice manager in April, brings a wealth of experience to the newly created role and in 2006 received the AGCSA's Excellence in Golf Course Management Award, while later in the year he also collected the inaugural Australian Golf Digest's Superintendent of the Year Award.

WAGES AND SALARIES SURVEY

As well as setting up the new best practice service, Sellar is also in the process of conducting an industry-wide wages and salaries survey.

To date nearly 70 superintendents have responded and Sellar is calling for more responses especially from Queensland, Tasmania, South Australia and Western Australia (the survey can be downloaded from the AGCSA website or through the AGCSA's weekly email newsletter The Cut).

"This survey is designed to assist golf course superintendents and their staff gain a clear picture of the comparative wage and salary levels within our industry," says Sellar.

"It is intended to assist superintendents and their employers through periods of negotiation, budgeting and position creation. Subsequent work in this area will look to build on this information and develop a profile of the golf course management industry, taking into account the diversity of responsibilities superintendents now manage on a daily basis, to enhance the reputation of our profession."

Figures to date show the average total salary package for a superintendent is over $80,000 per annum with wide variation between the top and bottom rates. The survey also indicates that average total maintenance staff is around 10, while the average hours worked by superintendents per week ranges from 41 in winter to 51 in summer.

For more information about the AGCSA's HR and best practice service, contact Daryl Sellar on 0408 322 397 or email daryl@agcsa.com.au.

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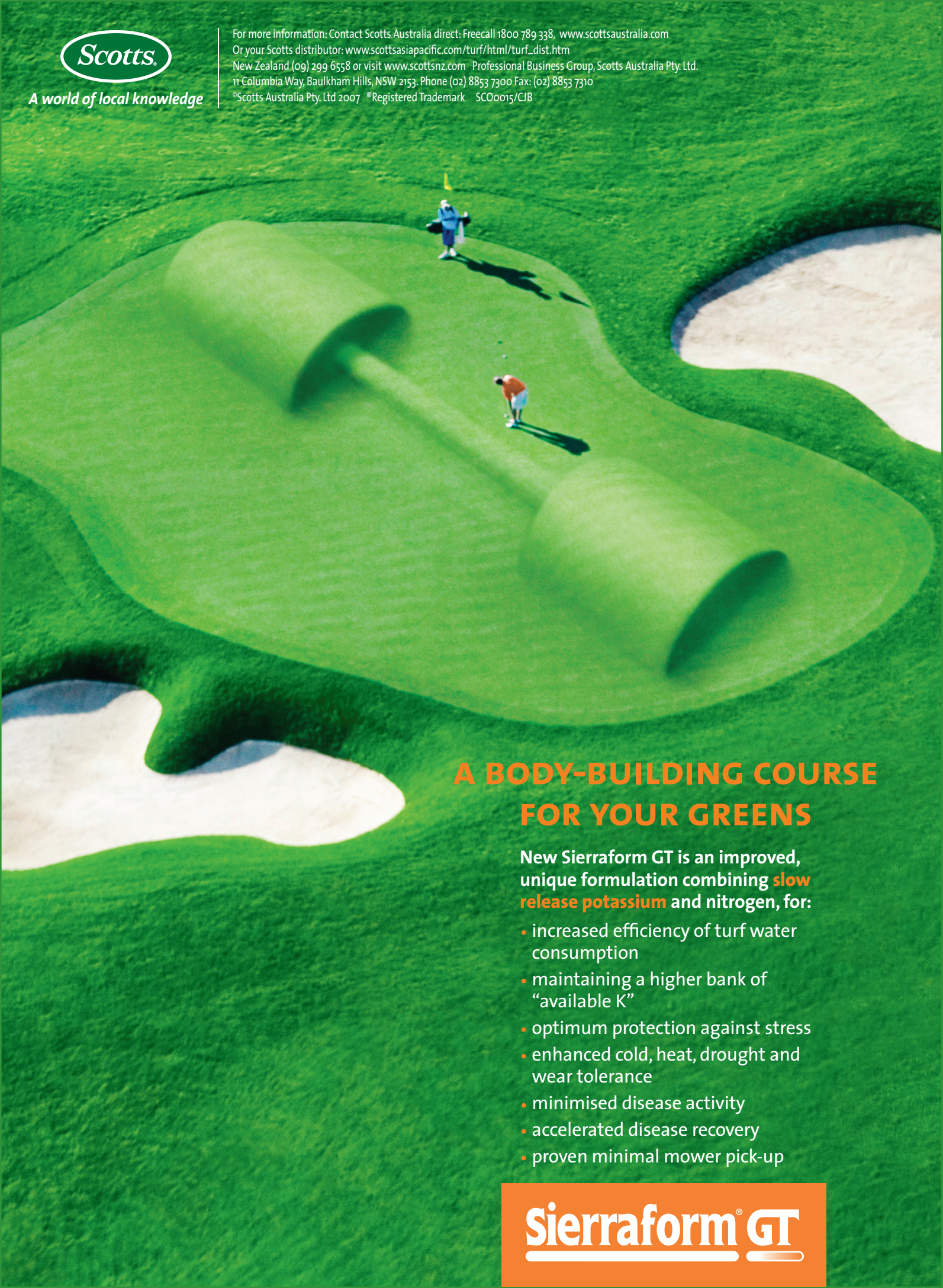

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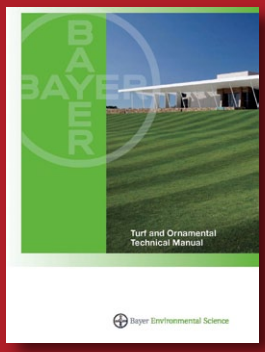
BAYER'S TECH MANUAL IS BACK

Bayer Environmental Science released its new and improved Turf and Ornamental Technical Manual at the recent 23rd Australian Turfgrass Conference and Trade Exhibition in Cairns.

The 2007 edition comprises 75 pages of up-to-date information relating to weeds, insect pests and diseases in turf and ornamental situations. It includes colour photos and up-to-date information in relation to their management.



Bayer's 2007 turf and ornamental manual

The complete Bayer range of turf products are also presented with tips on how to get the most out of your applications and quick reference guides to match products to problems.

The manual includes technical information regarding the calibration of knapsack sprayers along with information related to spray applications such as a pH stability chart, a humidity chart, tank mixing tables and resistance management charts. Product stewardship and OH&S issues are also addressed.

The manual is designed as a document for all professionals involved in amenity horticulture management, with information relevant to turf and urban horticultural organisations (e.g.: golf courses, bowling clubs, race tracks, sportsfields, parks and gardens as well as landscape and urban horticulturalists).

With every two or more litres of Merit turf and ornamental insecticide from your local distributor of Bayer Environmental Science products (Globe, Nuturf, Maxwell & Kemp or Oasis Turf) you will receive a copy of the manual.

For more information please contact Bayer Environmental Science on 1800 223 002.

NEW SOLUTION FOR CONTROL OF *POA ANNUA*

Turf Culture Coliseum (active constituent rimsulfuron) has recently been registered for the control of wintergrass (*Poa annua*) in couch.

Coliseum allows turf managers to control the various genotypes of *Poa annua* that other herbicides have struggled to manage, and has shown to be user friendly compared to other herbicides in the sulfonylurea family.

Coliseum has very good root uptake and can be washed in just one hour after application, which greatly reduces the chance of tracking and damage to non-target areas. Irrigation should be applied prior to foot traffic the following morning as sulfonylureas can reactivate with heavy dews. The irrigation cycles are short to ensure the product is washed off the leaf and to enhance root uptake.

Coliseum has a short soil life of three to seven days, allowing re-seeding seven to ten days after application. This is ideal if overseeding of tees or sports fields is required for assistance with winter wear.

Coliseum is currently being trialled for the removal of ryegrass out of couch, as US data has shown the active constituent rimsulfuron to be extremely effective in ryegrass control.

TURF culture Coliseum Herbicide

AVIVA'S PURE WATER SOLUTION

With Australia's water crisis having a major impact on the turf management profession, a number of golf courses and turf facilities are looking at installing desalination plants as one means of securing their future water supply.

Reverse osmosis technology has advanced considerably in recent times and uses highly advanced membrane and pump technology to extract pure water from seawater, salty borewater and recycled water.

One such company embracing this new technology is Aviva Pure which is the agent for Citor desalination units that have been produced in WA for over 30 years.

Aviva Pure now offers a number of Citor reverse osmosis desalination units to the Australian turf market ranging from low salinity

units (0-5000ppm), brackish water units (5000-15,000ppm) to seawater units (15,000 to 40,000ppm).

The units are self-cleaning, require less maintenance and can operate 24 hours a day, every day of the year. The units can produce anywhere up to 1.5M per day and Aviva Pure will train users in their operation as well as periodically service and maintain them.

For more information about Aviva Pure's desalination plants call 1300 734 186 or visit www.avivapure.com.au

VERMONT GOES ORGANIC

NSW-based sand supplier Vermont Sands, which has serviced the golf industry for the past 30 years, has recently released a new organic topdressing product which topdresses and fertilises at the same time.

Called Vermont organic top dress, it is a fine blend of natural products designed to produce a balanced, nutrient enriched topdressing. The blend is a compact, slow-draining combination which is a source of immediate slow-releasing nutrients specially blended for use on green surrounds, tees and fairways.

The blend contains a fine green waste organic compost, vessel composted organics, fine sand, soil, composted grain husk and dust (to encourage water holding absorbency) and poultry manure.

For more information please contact Julie-Ann Davey on 0417 419 597 or phone Vermont Sands on (02) 4572 3151.

MILLER JOINS LIVING TURF

Living Turf has appointed Stuart Miller as its new regional sales manger for southern NSW and ACT. Miller has a long history in professional turf management in NSW and in the ACT. As well as serving on industry associations, his most recent role has been managing turf product sales throughout NSW for Patons Fertilizers.

In his new role at Living Turf, Miller will represent key brands including Simplot, MATCHplay, Syngenta, and Supaturf. He will deliver technical services and expertise to Living Turf's customers, while keeping them informed in the latest developments.

For information on Living Turf's range of products and services, contact Stuart Miller on 0407 100 222 or by email smiller@livingturf.com

REDLANDS ON A ROLL

The Queensland Department of Primary Industry and Fisheries' Redlands Turf Research Station is on a roll after receiving a timely donation. The facility recently took delivery of a Tru-Turf roller for use on its greens grasses that the currently part of various trials. Ray Dufty (right) from Tru-Turf was on hand to present the new equipment to Redlands research leader Dr Don Loch (centre) and recently appointed experimentalist Jon Penberthy (left).

NSWGCSA

It's amazing how fast the previous 12 months have passed since becoming president of the NSWGCSA. I would like to take this opportunity to thank the board of directors for their time and contributions throughout the past year – Darren Jones with finance, Scott Riley and Craig Molloy with field days, Justin Sheehan for the newsletter, Mark Warwick as secretary, Craig Wright with membership, Shaun Probert and Nathan Elder with the education and environmental portfolios and Mark O'Sullivan with advertising and apparel.

Scott Riley will soon be standing down after four years of service. Scott has been in charge of field days during that time and his commitment to the industry has been outstanding. I would like to thank him for all of his work and dedication and wish him well in his future endeavours.

There is no doubt the association is in the strongest position it has been in for years. Membership is at an all time high with 329 current members and the number continues to rise. We are also strong financially so we are pleased to be able to put some of the funds back into the association with a range of initiatives such as being able to provide high quality presenters at upcoming events and improving our range of apparel.

The annual ambrose event was postponed until the 13 August due to devastating floods and storms. Newcastle Golf Club had 600mm rainfall in just three weeks.

Many areas in NSW experienced the heaviest rainfall in recent years and some areas received record rainfall. Even a ship called the Pasha Bulker decided to take a closer look at Nobbies Beach in Newcastle!

Storms ripped through the Newcastle region during winter causing widespread damage to golf courses

With the recent rain, dam levels have reached 58.5 per cent however this does not mean water restrictions have been lifted. John Ethel from Sydney Water has informed me that the Minister for Water will not be reviewing water restrictions until dam levels hit 65 per cent.

SPONSORS

I would like to thank all the sponsors and advertisers who have supported the NSWGCSA over the past year. I realise that sponsorship and advertising dollars are harder to come by and consequently getting a better bang for your buck is very important.

I am going to be writing to all companies over the 12 months to inform them about advertising and sponsorship packages. Obviously not everybody is going to get an opportunity to sponsor a day, but the board is currently reviewing other options to thank our current sponsors, such as offering editorials wherever possible in our newsletter.

AGCSA

Martyn Black, the association's stand-up comedian, poet, holder of the Indian Golf Championship and an all-round great Australian has stood down from the AGCSA board this year. I would like to congratulate Martyn for not only his four years of service to the AGCSA, but also for his previous eight years on the NSWGCSA Board, three of which were spent as president. On behalf of the entire association thanks Martyn for your contribution to the industry.

John Odell has been elected to the board of directors of the AGCSA. I would like to congratulate John on his new position and wish him luck in his new role.

EDUCATION

Congratulations to Stuart Millar from Oatlands Golf Club for becoming the New South Wales Apprentice of Year. As a member of the judging panel, I can vouch that it was a very difficult decision as the quality of candidates was excellent this year.

Finally, I would like to thank all the superintendents I have spoken to over the past 12 months who have offered advice or a friendly chat. I have enjoyed the role as president and will endeavour to continue to serve the industry the best way possible.

ANDY HUGILL,
PRESIDENT, NSWGCSA

SAGCSA

The SAGCSA AGM was held at Blackwood Golf Club on 14 June. Newly appointed superintendent Steve Pellatt gave a very informative talk on the course changes taking place and the challenges he faces in his new role. Thanks to Steve and the Blackwood Golf Club for hosting the day.

With the AGM done and dusted the SAGCSA Board has met and discussed initiatives for the year ahead. I am pleased to report that SAGCSA now has a clothing range available for its members with shirts, jackets and hats now available with embroidered SAGCSA logos. All clothing will be sold at very reasonable prices and is of a high quality.

With some technical support from the AGCSA we are currently developing an online survey to present to members in the near future. The aim is to gather information on water use and feedback on the impact of water restrictions on SA golf courses, general data on state-relevant issues and some feedback on member's expectations of the SAGCSA so that we can best direct our efforts into areas that represent the majority of SAGCSA members. I would urge all members to take the time to complete the survey. The survey is likely to be sent via email; members that are not online will be mailed a copy.

I would like to extend a warm welcome to Digby Grayston (Adelaide Shores) and Stuart Gillespie (Riverside Golf Club) who are our newly positioned SAGCSA board members. Digby is back for another stint on the board and will be secretary and Stuart will take on the education role. The SAGCSA can only benefit from the enthusiasm and experience of these two gentlemen.

The winter months have produced consistent rainfall without being spectacular. We can ill afford to repeat the spring of 2006, which was one of the lowest rainfall periods in the state's history. Let's hope that there is plenty more to come and that the Murray catchments continue to fill.

ANDREW BLACKER,
PRESIDENT, SAGCSA

GCSAQ

It has been great to see some parts of the country getting good winter rains, but here in Queensland and northern New South Wales it has been very localised. Brisbane received 1mm in July with our water supply now below 17 per cent. The past couple of months have seen some of the biggest frosts for many years which have even cut trees and shrubs around many golf courses.

Our annual country tour was once again a big hit. This year's trip took us to Coffs Harbour and it was great to see some of the locals joining in the activities. On the golfing front Jason Foster took out the coveted Orange Jacket and proceeded to let everyone know in town what a great golfer he was.

For something different this year lawn bowls was played on the Monday and surprise, surprise the team of Les Austin and Barry Harken took out this event (this shows us what you must be doing in retirement!). The education part of this weekend was very informative and we thank our sponsors.

The GCSAQ AGM was held at Murwillumbah Golf Club on 13 August where a good turn out of 50 took on this beautifully prepared golf course. Eventual winner of the GCSAQ Toro Championship was resident Murwillumbah assistant superintendent David Hobday who used his local knowledge to good effect.

The AGM followed lunch with the election of a new committee. The GCSAQ committee for the next period will be Rodney Cook (The Grand GC), Justin Kelly (Gainsborough Greens GC), Dave Morrison (Windaroo Lakes GC), Peter Lonergan (Coolangatta Tweed Heads GC), Ben Cavanagh (Brisbane GC), Craig Toms (City Golf Club, Toowoomba), Brian Cox (Murwillumbah GC) and our one new member Mark Hauff from Colonial Golf Club. I thank all on the committee for putting their hand up and I know we will have a great year.

To the three members that stood down due to work commitments and job changes we thank you for your efforts and dedication also. Stepping down is tireless education officer Scott McKay (The Golf Course Company) who has done a magnificent job over the past few years, Jason Foster (Arundel Hills GC) and Stuart Laing (ex-Royal Pines Resort).

On the staffing front, Stuart has left Royal Pines Resort to take up the position of general manager of Turf Force. A warm welcome too to Dan Brown who has taken up the position of superintendent at Royal Queensland which will be a bit of a change from Barnbougle Dunes in Tasmania.

ROD COOK,
PRESIDENT, GCSAQ

TGAA NSW

TGAA NSW hit the road and headed up to the Hunter Region for our second regional seminar at Kurri Kurri TAFE on 14 August. The response to the day was excellent with over 150 people attending. There were a variety of topics covered on the day including both technical and practical presentations.

The delegates were presented with experiences at three very different venues. Russell Fensom talked about the challenges involved with hosting the NSW City v Country rugby league game at Coffs Harbour's BCU Stadium, while John Odell from Royal Sydney Golf Club gave an insight into preparing for the 2006 Australian Open. I also discussed the constant challenges faced at Telstra Stadium in presenting a variety of sporting events at international standard every week.

On a technical level, Dean Scullion of e-par discussed the environmental aspects of golf course construction, Patrick Madden (Syngenta) reviewed how to get the best results from pesticides, Peter Kirby (Nuturf) explained what water testing results really mean and Jyri Kaapro (Bayer Environmental Science) discussed turf herbicide technology.

The day went really well and many thanks to all our presenters for their time and effort. Also to the sponsors who supported the event and special mention to Mark Crawford and Chris Booth of Kurri Kurri TAFE who worked hard to get the event up and running.

We are now preparing for our final event of the year – The Sportsman's Charity Luncheon – which will be held on 16 November 2007 at the Parramatta RSL Club. TGAA NSW is very proud of this event as it brings the turf industry together on a social level and supports a great charity – The Children's Hospital at Westmead. Until next time.

GRAEME LOGAN,
PRESIDENT, TGAA NSW

TGAA VIC

Hi all and welcome to what will be my final column for the TGAA VIC. I am stepping down from the committee to undertake some further turf studies. My time on the TGAA committee has been very enjoyable and I certainly intend to re-apply once I have completed my study and the kids are at school. Being on the committee is very rewarding and opens your eyes to a lot of issues that we take for granted. It also enables you to meet some fantastic people in the industry that you may not have met otherwise. I highly recommend that you give it a crack at some stage.

Back onto more turf related issues, the above average rainfall over the last couple of months has somewhat eased the burden for the short-term. It hasn't, however, resolved our long-term problems in regard to water restrictions. I want you all to know that the TGAA is doing all that it can in terms of support for the turf industry and trying to make the government and water authorities aware of our needs.

We have representatives on the VICSWU committee and have formed a taskforce within our group to meet with water authorities and government representatives. It is an ideal time to strike with the appointment of the new Minister for Water in Victoria, and the association plans to do everything it can.

On 4 July the TGAA held its annual Cricket Wicket Seminar at the MCG. The day was again well attended with about 240 members present. First speaker was Dave Sanguinetti from Trinity College in Bulleen. Dave presented the group with a detailed talk on their recent reconstruction on the Daley Oval.

Next speaker was Bruce Stephens from Anco. Bruce spoke about the recent reconstruction of the Flemington racecourse. They faced many challenges including the set-up and rotation of their portable farm irrigation to cover the whole track, but still managed to meet all the deadlines. This was a huge job and I think Anco should be commended for their professionalism and their handling of such a prestigious project.

The TGAA flew the next speaker, Gary Hoy, down from Sydney after three of us on the committee had been to Sydney in 2006 and seen his project. He is the grounds manager at Knox Grammar, which is situated in Sydney's northern suburbs. The school embarked on a $10 million project to upgrade one of their buildings and the main oval. A 500,000 litre water storage tank was built into an embankment and then a grandstand was constructed over the top.

The field was stripped back by 600mm and a sand profile field constructed. The field was converted from ryegrass to Legend couch, and after 12 weeks hosted a military tattoo and a week later seven games of rugby. The job was a great example of the lengths that companies are now going to in order to preserve and use water more intelligently.

Gary also spoke about the cricket wickets they maintain and the practices they are using. We thank Gary for his time and very informative talk, even though he didn't feel comfortable speaking in front of a crowd.

Michael Robinson from Sportsturf was our next speaker. Michael ran through the results of calcium use on cricket wicket trials that the TGAA had been running. The results can be seen on our website at www.tgaa.asn.au

Richard Winter the MCG arena manager was next and spoke about his time at the 'G'. He enlightened us about the staff set-up and the other grounds they maintain outside of the MCG. Richard ran through some of the different wicket preparation techniques they use for the different matches.

Thank you to everyone for putting up with me over the last two years and I hope to see you all at the TGAA functions. Keep learning, be innovative, stick together and keep smiling, because no matter what happens we still get to work in the best industry out there.

MATT HANRAHAN,
COMMITTEE, TGAA VIC

GCSAWA

The past 12 months for the GCSAWA have been successful with excellent attendance at all association-sanctioned events. While it has been rewarding on many levels, so too has it been challenging. The structure and integrity of our association formed over many years is underpinned by great individual professionalism, strong business ethics and camaraderie. We must keep the preservation of this unique association our major consideration as part of our daily interactions with golfers, managers, committees, the general public and other external stakeholders.

Today the association is in a strong position financially under the stringent control of treasurer Jeff Lane and the broader committee, who have ensured our small association can absorb any future shocks while providing the essential membership benefits at low cost. Support from our trade sponsors has again been exceptional and they remain key stakeholders in the development and success of this association. We are dearly appreciative of the generosity and support.

Professionally we are placed well within the turf industry with committee members sitting on committees having input into UWA research projects, the AGCSA, the DEC, Turf and Landscape Industry Association and TAFE. On the ground we have Geoff Kirk who constantly puts his hand in the air to do the running around and organisational work for most of our events which we could not operate efficiently without. In all it's a team that works well and I believe represents the interests of it's members well.

This year has been a good year again for our members generally and particularly for Darren Wilson and Peter Beach who represented their clubs and the association and subsequently won two major national awards which has made us all proud.

On a closing note I have decided to vacate the role of president of the GCSAWA after four years, serving in total nine years alongside some really good fellas. To all past and present committee members who I have worked alongside, I thank you dearly for your friendship, guidance, humour, professionalism and most importantly your equally strong passion for building a strong golf association.

I wish Darren, my successor, the best of luck in the future. The new committee is:
President: Darren Wilson (Wembley GC)
Vice-President: Craig New (Lakelands CC)
Treasurer: Jeff Lane (Joondalup Resort)
Secretary: Glen Cross (Mount Lawley GC)
Golf Secretary: Brad Anderson (Sun City CC)
Co-Opted Committee: Geoff Kirk (Total Turf)

BRAD SOFIELD,
IMMEDIATE PAST PRESIDENT,
GCSAWA

TGAA WA

The Western Australian government has announced a range of water efficiency measures aimed at reducing groundwater usage in the Perth region. From October 2007, garden bores will have three days per week watering restrictions imposed.

Local government authorities will be required to submit water efficiency plans to the Department of Water by July 2009 to comply with their licence conditions. All groundwater users taking 50M or more will require water meters. There will also be a ban on daytime (9am-6pm) watering from July 2008. For more information on the water reform programme, see www.waterwisewaysforwa.com.au.

The rainfall situation has improved, following the driest year on record in the Perth region in 2006, and below average rainfall for the first half of 2007. Perth received above average rainfall during July, and August has started very well. However, we are still approximately 150mm below the average rainfall year to date.

Our AGM, held at Hale School in July, was attended by approximately 45 members. The committee of Peter Ruscoe (president), Tony Guy (treasurer), Peter Maclachlan (secretary) and Ian Clark (events officer) was re-elected for 2007/08.

I was delighted to announce at the AGM that Geoff Marsh, former test cricketer and Australian cricket coach, has agreed to be the patron of our association.

The 2007 TGAA WA Lin Hambleton Bursary has been awarded to Daryl Kemp from Aquinas College. Daryl will receive a contribution of up to $500 towards tuition fees, textbooks, or other course related expenses to study turf or horticulture at Challenger TAFE in 2007.

PETER RUSCOE,
PRESIDENT, TGAA WA

President Peter Ruscoe congratulates TGAA WA Lin Hambleton Bursary recipient Daryl Kemp (right)

NZGCSA

We have had a very busy time of it in recent months with the build up to the New Zealand Sports Turf Conference and Trade Show which was held from 15-19 July at Westpac Stadium in Wellington.

Official numbers saw a total of 610 delegates registered for the conference with just over 100 of those from the trade. Programmes were running concurrently for golf, sportsfields, cricket, the New Zealand Recreation Association, bowls and racecourse managers. The programmes for each individual sector were varied and wide ranging but catered to every delegate's needs.

The week started for the NZGCSA with our golf championships played at the Miramar Golf Club in very benign conditions. The Miramar course was in fantastic condition and consequently the scoring was very good. Blair Dibley from Millbrook in Queenstown won the gross with a 72, while some rookie by the name of Brett Burgess won the nett with a 68!

The NZGCSA 75th Jubilee Dinner was held on the Sunday night and for most was the highlight of the week. Most of our life members and four ex-presidents were present. We were also honoured to have GCSAA president Ricky Heine and his wife Jana in attendance, as well as other long-serving superintendents from throughout New Zealand, some of whom have retired in recent years.

The evening also doubled as our awards evening with James O'Malley from Millbrook winning the coveted Graduate of the Year Award sponsored by Power Turf. Leo Barber, superintendent at the Paraparaumu Beach Golf Club was the recipient of the Fellowship Award, sponsored by John Deere, and the Distinguished Service Award sponsored by Prebble Seeds was presented to Layne Young, superintendent at the North Shore Golf Club.

All three are worthy winners of their respective awards. Presenting the awards at the 75th dinner gave us a chance to showcase our major awards to those that have gone before us. There is no more kudos than being presented an award in front of your peers.

Keynote speakers in the golf programme included Heine who gave us an insight into some of the issues facing golf clubs and superintendents in the US where clubs are becoming more service-orientated as they compete against other clubs and sports for patronage. Ricky also reported a net loss of golf clubs in the US, meaning the number of clubs closing exceeded the number that had opened in the last 12 months. Ricky also presented papers on HR in the USA and golf course design US style which was very informative and worth listening to.

Other keynote speakers included Dr James Murphy from Rutgers State University of New Jersey and Peter Donkers from Long Reef Golf Club, winner of the 2006 AGCSA Claude Crockford Environmental Award.

All speakers along with various local speakers contributed to a very positive conference. The trade show was our best yet with nothing but positive comments from all concerned.

During the conference the NZGCSA annual meeting was held with Peter Boyd, superintendent at the Pakuranga Country Club in Auckland, being elected as president. I had served six years in the job and it was more than time for a change. The NZGCSA is in a very strong position and will continue to grow.

As we look to the future there are a few things on the horizon such as the sustainability of the sports turf conference, funding issues and continuing to improve on the services we offer to our members and the golf community in New Zealand as a whole.

As this is my last report for the ATM I want to thank you all for the opportunity to keep you informed about things in New Zealand. Hopefully I have created a desire for you to come and visit one day. There aren't as many sheep over here as you may think!

BRETT BURGESS,
IMMEDIATE PAST PRESIDENT,
NZGCSA

VGCSA

Congratulations to Leigh Yanner who has moved to take over as course manager at The National Golf Club from Moonah Links. Kyle Wilson has moved from The National Ocean Coarse to superintendent at Moonah Links, while Gary Smith (Huntingdale Golf Club) has been appointed the new superintendent at Chalambar Golf Club. Good luck to all those that have moved into a new position.

Winter 2007 has brought with it some good rains in Victoria. Hopefully the rain will continue late into spring and relieve summer restrictions.

The annual conference has come and gone even though I'm still feeling the effect from a virus I picked up in Cairns. It was great to escape the cold Melbourne winter and it was well attended by Victorian superintendents. Two of our own superintendents were guest speakers – Michael Picken (Riversdale Golf Club) and Peter Frewin (Barwon Heads Golf Club) – who both should be commended on the professional manner in which they delivered their presentations.

It was great to catch up with many superintendents from all over the country and have a beer or two in the Toro Rhinobar and discuss your problems. I would like to thank Dean Hill, Mick Licht (Toro Commercial), Paul Woloszyn (Toro Irrigation), Ted Boltong (Active Safety) and Brendan Graham (A&M Watering) for their generosity.

We only have two more meetings to go for this year. The first is the Bayer Environmental Science Golf Day at Kingston Heath on Thursday 11 October and finally the Christmas function at Huntingdale Golf Club on Saturday 8 December.

MICHAEL FREEMAN,
PRESIDENT, VGCSA

TGCSA

Winter finally arrived with good rains mixed with lots of frosts. The TGCSA held its major field day over 21-22 August at Port Sorrell Golf Club in the state's north. Major sponsors were Pellows Mowers and Tas Turf Solutions. We also attracted some minor sponsors which is a record for our association.

Martyn Black was our guest of honour and entertained one and all, while we would also like to thank Andrew Peart from the AGCSA for making the trip down and presenting. It's marvellous what a game at Barnbougle Dunes will do to encourage people to make the journey to the southern land!

Our next field day will be held at Royal Hobart and Tasmania golf clubs in November. We hope all attend this event as well.

PETER MEDWIN,
PRESIDENT, TGCSA

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LOWARA

"The growing-in phase of a new golf course is critical and requires detailed planning, particularly when it comes to irrigation.
When the new Settlers Run Golf Course at Cranbourne was in the early stages of planning we had no hesitation in recommending a Lowara pumping system because of its better control, long term reliability and ease of maintenance.
The Settlers Run pump installation incorporates 4 variable speed Hydrovars which are uniquely linked to Toro Irrigations' Sitepro software which delivers to the Superintendent precise information on the performance of the total pumping system, which is absolutely critical to the grow-in phase.
Combine that with Brown Brothers' exemplary after sales service and Settlers Run couldn't be in better hands."

Brendan Graham, A&M Watering

How the Hydrovar reduces energy consumption.

Most applications involve the pump operating either along its full speed performance curve or the pumps performance is throttled or regulated by a valve. The Hydrovar eliminates these operating methods by regulating pump speed and hence output to match the system demand. This saves wasted energy traditionally lost in these conventional pump systems. Energy savings of up to 70% can be realized. (figure 1)

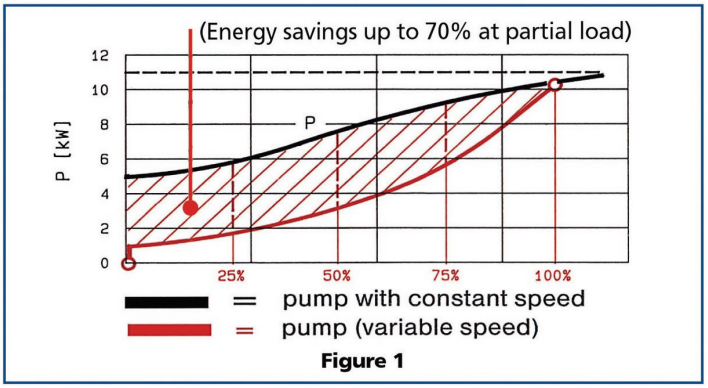

Figure 1

What is Hydrovar?

Hydrovar has gained a reputation as THE pump mounted microprocessor pumping system controller. But it does much more than just change motor speed.

It actually manages the performance of the pump to match a wide range of system conditions and requirements.

Hydrovar is fully programmable on site as it incorporates the microprocessor and the variable drive in one compact and unique package

How Hydrovar reduces maintenance cost.

Hydrovar software is designed specifically for centrifugal pump operation, control and protection. Hydrovar can thus be setup to protect the pump from operating under various unfavourable conditions eg. cavitation, operating against closed head, low NPSHa or operation past a pumps maximum flow rate. Hydrovar will automatically shut down and alarm if adverse conditions occur.

Hydrovar provides the Golf Course Superintendent with the flexibility of watering required with substantial savings on installation, power usage and maintenance. For details about the experience of some of Australia and New Zealands most prestigious Golf Clubs who have installed Hydrovar pumping systems, contact the Lowara distributors nearest you.

What is Flowlink?

TORO

To assist green-keepers and Superintendents in the golf course, turf and irrigation markets, Lowara and TORO Irrigation teamed up together to develop a link between the Toro Sitepro software and Hydrovar.

The link operates with up to 4 Hydrovar pump systems and monitor running / fault conditions and measures pressure and flow of the pump system.

All these parameters are displayed on the central irrigation control computer

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