

Golf Course 2030

Australia

February 2022

An industry roadmap addressing challenges from and taking opportunities presented by, the changing climate, resource constraints and regulation to secure optimal golf course condition and playability for current and future generations.



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Introduction

Golf Course 2030 (GC2030) was established by The R&A in 2018 as an industry initiative to consider the impacts, both positive and negative, of the changing climate, resource constraints and regulation on course condition and playability.

Its aim is to produce a roadmap that will steer the sport to mitigate the challenges and take advantage of the opportunities that these issues present.

The GC2030 plan for Australia will promote greater resilience through appropriate management practices which address the challenges and opportunities. It will meet strategic needs at regional, national, and local level, and the operational needs at golf facility level.

Australia's GC2030 plan is intended to align with The R&A's purpose: to make golf more accessible, appealing and inclusive, and to ensure it is thriving 50 years from now. Our golf courses are our sport's foundation. Without conditioning and playability, suitable to the venue's customer base and location, that is appealing to golfers, the game will not thrive.

At the core of the GC2030 project, is the UN's 2030 Agenda for Sustainable Development and the [17 sustainable development goals](#). The outcomes through GC2030 will have positive impact on the following goals:

- 3. Good Health & Well-being – Ensure healthy lives and promote well-being for all at all ages
- 6. Clean Water & Sanitation – Ensure availability and sustainable management of water and sanitation for all
- 7. Affordable and Clean Energy – Ensure access to affordable, reliable, sustainable, and modern energy for all
- 9. Industry Innovation and Infrastructure – Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation
- 12. Responsible Consumption & Production – Ensure sustainable consumption and production patterns
- 14. Life Below Water – Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- 15. Life on Land – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forest, combat desertification, halt and reverse land degradation and halt biodiversity loss
- 17. Partnerships for the Goals – Strengthen the means of implementation and revitalise the global partnership for sustainable development

The outcomes from GC2030 are designed to help course managers sustain, perhaps even improve, course condition and playability compared to that we enjoy today.

Sign off



James Sutherland
CEO
Golf Australia

Mark Unwin
CEO
Australian Sports Turf Managers Association

Stakeholders

The core stakeholders in the GC2030 Australia project are:

- The R&A
- Golf Australia
- Australian Sports Turf Managers Association
- The PGA of Australia
- The WPGA Tour
- Golf Management Australia
- Society of Australian Golf Course Architects
- Sport Australia, and
- Australian Golf Clubs and Facilities

Additionally, throughout the action phases of the project, it is anticipated that the following will be engaged or impacted:

- State Government Sport, Environment, and Water Departments
- Local Governments
- Tertiary Turf Grass Education Institutions
- Sports Environment Alliance
- Golf Course Chemical Suppliers
- Golf Course Irrigation Infrastructure Suppliers
- Turfgrass Suppliers
- Sustainability Organisations

National Sustainability Working Group

The GC2030 National Sustainability Working Group includes the follow individuals from core stakeholders:

- Chris Gray, Head of Sustainable Golf, Asia Pacific, R&A
- David Gallichio, General Manager Golf Development, Golf Australia
- Matt Chesterman, Clubs & Facilities Support Senior Manager, Golf Australia
- John Stamp, Clubs & Facilities Support Manager Victoria, Golf Australia
- Mark Unwin, CEO, Australian Sports Turf Managers Association
- Paul Vardy, CEO, Golf Management Australia
- Geoff Stewart, General Manager Membership & Education, PGA of Australia
- Karen Lunn, CEO, WPGA Tour Australasia
- Sue McGill, Director Sport Infrastructure and Inclusion, Australian Sports Commission
- Paul Mogford, Society of Australian Golf Course Architects

The members of the NSWG will be reviewed from time to time, with changes made for the benefit of the GC2030 project.

Drivers of Adaptation

There are three drivers to adapt the way optimal conditioning and playability are achieved for future generations. They are climate, resources & regulation. The Golf Course 2030 project must assess the impact these three drivers will have on the day-to-day operations of golf courses and facilities.

Climate

Changes in climate, and in particular the climate extremes that we are tending to experience are increasing the challenges that turf managers are facing. From the CSIRO and Bureau of Meteorology's report '[State of the Climate 2020](#)', and relevant to turf management, climate predictions for Australia suggest that there will be changes as follows:

- Further increase in temperatures, with more extremely hot days and fewer extremely cool days
- A decrease in cool season rainfall across many regions of southern Australia, with more time spent in drought
- More intense heavy rainfall throughout Australia, particularly for short-duration extreme rainfall events
- An increase in the number of high fire weather danger days and a longer fire season for southern & eastern Australia
- Fewer tropical cyclones, but a greater proportion of high-intensity storms, with large ongoing variations from year to year.
- Climate change or 'shift' in geographic zones i.e. southern states becoming less temperate

These patterns will have an impact on golf courses as they will require:

- Increased irrigation watering during warmer months to counter the increase in temperature
- Greater chemical and mechanical inputs to counter the negative impacts of increased irrigation
- More funding to source the increased resources required

In short, there will be an increase in the reliance and pressure that is already placed on critical resources such as irrigation water, chemicals, machinery, and funds.

Resources

The resources considered essential for today's golf course are likely to become scarcer and cost more. Included are water, pesticides, fertilisers, sand, energy, and labour. Resource use in Australia varies significantly from region to region, largely based on local climatic conditions. Within a golf course, different areas of the course receive differing levels of treatment and resource.

- Greens are the most intensively managed part of the golf course due to the role they have to play within the game. They take up roughly 1 hectare of a typical 60 hectare, 18 hole golf course.
- Fairways are less intensively managed but cover around 16 hectares. Any single input over this area will exceed that of what would be applied to the greens.
- Teeing Grounds and Green Surrounds occupy similar land the greens, and receive a level of treatment between that of the greens and fairways.

- Bunkers, are a sand-filled hazard that while small in size require ongoing input in the form of labour and sand.
- Maintained Rough, will typically receive little input besides time for mowing and maintenance.
- Other Natural Areas, will require less maintenance, though controlling weeds, pests and disease allows effective management of native vegetation areas.
- Useful life of assets such as greens, tees, bunkers. For example, a green may need replacing after approximately 20 years of use.

The level of resource use and maintenance frequency at a course will be relevant to; the standard that each area of the course is maintained, the area of land each area occupies, and the unique climatic and land conditions of the location.

Regulation

Regulation in Australia is directly related to resource use. It exists at all levels of government and at times can be challenging for course managers to keep up with.

Water

- Legislated under State Acts of Parliament
- Managed by regional water service providers and authorities
- Regulations will vary between the source of water, e.g. potable, harvested, recycled, ground water or surface water and river or catchment

Pesticides/Herbicides

- Legislated under State Acts of Parliament
- In all states, products must be registered for use on turfgrass
- Many products that would prove useful are not registered for turfgrass are registered in other settings

Labour

- Legislated under Federal Acts of Parliament, namely the Fair Work Act
- Directly governed by the National Employment Standards of which each industry's particulars are contained in Modern Awards

Land

- A segment of Australia's courses are located on public land with varying restrictions and threats to the existing access and recreational usage

Future Scenarios

Presented here are 3 scenarios, from business as usual to a potential doomsday or extreme weather, water scarcity, high resource cost and no chemical availability. It should be recognised that there is a sliding scale between the scenarios.

Scenario 1

Limited change from the environment that now exists as alternative technologies, management solutions and behavioural change address the challenges posed by climate, resources and regulations and optimal golf course condition and playability is secured.

The largest challenge remains water availability, class, and cost. Investment from Clubs and Government would be directed toward securing of water allocations, and investment into research and development into recycled, grey and reclaimed water and the development of increased access to water infrastructure.

Course condition and playability is comparable to that available today. Drivers for change are weak and opportunities to enhance the potential of golf courses, their performance and environment will not be realised. There could be extra costs for golf businesses that position themselves as early adopters of new technologies, which may be passed on to the customer, so golf could be more expensive.

Scenario 2

Severe restrictions in the availability and use of synthetic chemical plant protection products, together with 50% less water being available for irrigation compared with current levels. Alternative technologies, management solutions and behavioural change partially address the challenges posed by climate, resources and regulations.

More months of the year will see greater course closure due to extreme weather events, notably flooding, and more damage and scarring to turf from water and pesticide restrictions, related to hotter and extended summers and shorter winters experiencing more significant rainfall events in shorter periods, more often.

The condition and presentation of surfaces will see periodic troughs, with golfers having to accept a different style of golf and course performance, notably in terms of turf colouring and reduced green speed.

There will be increasing pressure on golf facilities to survive as the cost of maintenance and amenities increases. This will lead to opportunities for a greater flexibility in course design, increased out-of-play areas, less maintained turf, and an increase in diversification to provide multi-functional green space. The challenges from green space requirements, multi-use requirements and increased population growth, increases pressure on golf Courses to rationalise land usage. Some courses in Australia are required to open amenities for public access, limiting available time for play and further impacting on the conditioning of courses. A number of clubs will be forced to sell portions of land to comply with mounting pressure from governments requiring lands for community use or housing development, impacting local environmental conditions as native vegetation and wildlife habitats that are created and managed on these courses, is removed.

Golf businesses will need to spend more on new technologies and more expensive resources to sustain course condition and playability. Golf will be more expensive to play. Golf facilities will also see a decline in income as deteriorating conditions reduce the attractiveness of the sport,

There will be some course closures, notably those wholly reliant on water and synthetic chemical plant protection products to keep a grass cover, and this will impact on the contribution of golf to the local, regional and national economy. With the course closures, we will see a decline in course management related employment and corresponding decreases in apprenticeships placing further pressure on the industry and impacting the talent pool for future years.

Golf Tourism will decline due to decreased course conditioning, resulting in a pronounced impact from the contribution of golf to the local, regional and national economies.

Scenario 3

The banning of all chemical plant protection products and fertilisers, together with 75% less water being available for irrigation compared with current levels. Alternative technologies, management solutions and behavioural change fail to address the challenges posed by climate, environmental resources and increased regulations.

There will be longer periods of course closure, damage from extreme weather events and disease/pest/weed incidence and the high cost of resources results in loss of customers and permanent closure of many facilities.

There will be substantial course closures particularly in the regional areas of Australia, and the merging of a number of Clubs due to excessive financial concern. There are serious consequences for employment, health and the contribution from golf to the local, regional and national economy, prevalent course closures, will result in a sharp decline in course management related employment, and reduction in skills and knowledge from the industry, and large decreases in sports turf management apprenticeships.

The combination of hotter summers and less water being available means that only those with sustainable sources of water for irrigation can retain a reasonable cover of grass. Course renovations and re-designs will reduce dramatically, and only those that can afford course renovation, a secure water supply and significant levels of extra labour or automation of certain maintenance practices will be able to cope with these pressures and, even in such situations, golf will be regularly played on inferior surfaces compared to what we enjoy today. The use of artificial turf increases for those that can afford it as the problems in managing natural turf become insurmountable, though this significantly changes the way golf is played as we know it.

Land access and green space requirements escalate; forcing the closure and acquisition of many clubs in metropolitan areas and forcing some Clubs to relocate. Courses are required to open amenities for public access, significantly reducing available playing time and further impacting financial hardship for Clubs. Acquisition of lands will increase for community use or housing development, impacting land and soil quality, degradation of green corridors in metropolitan areas and native vegetation and wildlife habitats is removed.

Practical Action

There are a number of fundamental, universal practical principles for golf course development and management which extend across the decision-making culture, agronomic practices, and broader considerations of golf's impact on and contribution to nature and local communities.

Many of the practices below are directly related to the ongoing management of a facility. Due consideration must be given to them during a design phase of a new build, redevelopment, or improvement of an existing facility. A poor design will limit the environmentally sustainable outcome that will be delivered through improved management practices.

The following is offered as a guide to those in decision-making positions. The actions below are intended to take place when an opportunity arises or is created through planning, and not as an immediate requirement.

1. Plan over the longer-term and operate under consistent policies, which are documented.
2. Prepare for future challenges. Consider the predicted impact of the changing climate (such as flooding, coastal erosion or drought), the availability and costs of vital resources and the constraints placed by regulation.
3. Recognise the professionalism of well qualified course managers and their staff. They will play a vital role in securing optimal course condition and playability.
4. Safeguard the reputation and well-being of employees, employers, golf facilities and the sport itself through compliance with the regulations. Decision makers at golf facilities must support their course management teams in adhering to this policy.
5. Create the right environment to produce healthy turf playing surfaces, which is fit for purpose, with adequate access to light and air, and good drainage and a biologically rich growing medium. Research, select and manage for turf species best adapted to local conditions.
6. Water scarcity and cost are going to be increasing issues for golf. Golf courses should be designed, built and managed to conserve water, using the least required to produce healthy turf and firm playing surfaces. Where feasible, water for irrigation should be generated in situ, through recycling drainage, rainwater harvesting, irrigation reservoirs and other technologies. Where feasible, water derived from non-potable sources should provide the irrigation source. Grass selection should be targeted at species which are fit for purpose, but which require the least amount of irrigation water.
7. It is likely that pressures and efficacy for pesticides will continue to be challenged. Facilities should look to reduce reliance on pesticides, identify and transition to alternative solutions to prevent and manage disease, pest and weed problems. Select and manage for grasses which are fit for purpose, and which have the greatest natural resistance to disease infection, pest attack and weed ingress.
8. Fertiliser use is likely to continue to be regulated as part of minimising environmental impact measures. Select grasses which are fit for purpose with minimal nutritional input and use products which offer the greatest protection to the environment.
9. Excessive organic matter accumulation creates weak turf, prone to stress and susceptible to disease infection, pest attack and weed ingress. Management practices used to control organic matter accumulation, (e.g. various forms of scarification and top dressing), cause stress to turf. Select and manage grasses which are fit for purpose, but which have a slow natural rate of organic matter accumulation and implement management practices.
10. Cutting height has a major influence on turf health and the requirement for maintenance, with repeated low mowing heights inducing turf stress, requires greater water, fertiliser

and pesticide inputs to correct. Mowing heights should be implemented to sustain grasses which are fit for purpose, but which are inherently healthy.

11. Energy derived from fossil fuels is going to become more expensive and golf facilities should be transitioning to cleaner, renewable sources of energy. Course design, construction and maintenance should be focused on energy efficiency, utilising grasses which are fit for purpose, but which require the least input of maintenance resource.
12. Disposal of waste to landfill will become increasingly expensive and socially unacceptable. Course design, construction and maintenance should focus on preventing waste and maximising reuse and recycling.
13. Biodiversity loss is a major global concern and golf courses have the potential to conserve and protect wildlife. Golf courses should be designed and managed to provide quality habitat for as wide a variety of native wildlife as possible.
14. Golf has a responsibility to wider society and the design, construction and maintenance of facilities should focus on making a positive contribution to local communities, such as by providing a multi-functional venue for wider community integration and recreation.
15. Objective assessment of the condition of playing surfaces, particularly the putting surfaces, on the golf course is required to monitor the impact of the challenges facing course management staff. The implementation of research outcomes and adaptations in management should be introduced at facilities, including turf compaction, firmness, smoothness, trueness, and speed.
16. The recording of key resource metrics for course management, e.g. water, chemicals, energy, waste and biodiversity. Sustainability reporting on course operations is required on a facility, country, region and international level. This is necessary to monitor the impact of the challenges facing greenkeepers, the implementation of research outcomes, adaptations in management and compliance with regulations.

Process

The process of the Golf Course 2030 Australia project is as follows.

Item	Timeline
Initial planning phase with the R&A, Golf Australia & ASTMA <ul style="list-style-type: none"> Through this phase there was a clear desire to progress with the GC2030 project to ensure effort is directed by the industry toward becoming more sustainable. 	Completed July 2020
Endorsement from the Australian Golf industry Council <ul style="list-style-type: none"> As Australian golf's wider stakeholder body, a successful GC2030 Australia project will be reliant on the support of the AGIC. The endorsement from the AGIC ensures that golf's stakeholder bodies will invest in sustainability outcomes through the GC2030 project. 	Completed August 2020
Key stakeholders identified and engaged in the GC2030 Project. <ul style="list-style-type: none"> Core stakeholders were identified and asked to provide state-based representatives to engage through the state workshops 	Completed January 2021
State workshops identifying localised issues. <ul style="list-style-type: none"> 6 online workshops were held, and the feedback consolidated into one document. This document formed the basis of discussion at the national workshop. 	Completed March 2021
National workshop identifying and consolidating national issues. <ul style="list-style-type: none"> The national group met and discussed at length the state-based issues presented. The group focused on presenting issues where achievable outcomes are possible. The National workshop identified which organisations would drive actions for each issue and identified board scopes for potential projects. 	Completed May 2021
Lodge plan with the R&A for feedback <ul style="list-style-type: none"> R&A sustainability team to provide feedback on the document for acceptance by the NSWG. 	Completed November 2021
Review R&A feedback and incorporate into document <ul style="list-style-type: none"> Feedback incorporated and document published. 	Completed January 2022
Communicating the GC2030 actions to the wider golf community. <ul style="list-style-type: none"> Communication of the action item will encourage further stakeholder engagement. Communication will include seeking expressions of interest from organisations to undertake projects associated with the action items. 	February 2022
Stakeholder reporting on GC2030 action items. <ul style="list-style-type: none"> Critical to the success of the GC2030 project is the practical action that Australian Golf's organisations take. The ownership that the core stakeholders bring will be critical to the impacts we have at club & facility level. At the first quarterly review, the GC2030 working group will expect a timeline from each of the core stakeholders for the next 3 years when they will look to address each of the action item 	Quarterly from 1 st Quarter 2022

Priority Issues, Action Plans & Responsible Parties

Priority Issue	Proposed Solution	Action Plan	Owner Organisation	Supporting Organisation	Importance (1 High, 3 Less High)
There is an existing and worsening gap in level of professional sports turf management staff	Develop opportunities to address: <ul style="list-style-type: none"> • Potential improvements in turf management education • shortage of qualified sports turf management professionals • Talent attraction into commencing Sports turf management apprenticeships 	Formalise research into the reasons why people are not attracted to or leave the industry	ASTMA	GA, GMA, SportAUS	3
		Raise awareness of the issues experienced by focusing on education to club & facility decision makers	ASTMA	GA, GMA, SportAUS	2
		Identify gaps in education availability and develop a plan to address those gaps within the tertiary education framework	ASTMA	GA, SportAUS	2
There continues to be varying levels of education on boards who ultimately guide decisions on the acceptable standard of our golf courses.	Improvements made to education for club boards on both GC2030 issues and the setting of appropriate expectations on turf standards for each facility with available resources	Develop a set of standards for golf course presentation with an expected cost analysis to meet those standards	ASTMA	GA, GMA, Sport AUS, PGA,	3
		Develop a set of planning and design guidelines aimed at addressing sustainability issues found on golf courses	SAGCA	ASTMA, GA	2
		Direct education of the standards to club & facility decision makers	GA	GMA, SportAUS, PGA, ASTMA	3
There is growing pressure on the use of water for irrigation purposes across Australia	Develop guidelines based on research, science and data supported to allow informed decisions into appropriate turf varieties in each State	Study into turf varieties that require less water and perform in different climatic conditions	ASTMA	GA,	1
		Development of best practice documents	ASTMA	GA	2

Priority Issue	Proposed Solution	Action Plan	Owner Organisation	Supporting Organisation	Importance (1 High, 3 Less High)
The positive indigenous flora & fauna outcomes at golf courses are understated and undervalued.	Develop more resources to promote the important environmental outcomes achieved at golf courses to assist with environmental concerns in media as well as campaigns to amend facility usage/access	Raise awareness to course decision makers about the benefits of an indigenous flora & fauna plan	GA	ASTMA, AGIC, SAGCA	2
		Raise awareness of the positive work being done by courses in this space to the general public	GA	ASTMA, AGIC, SAGCA	2
		Develop a practical resource to assist golf clubs and facilities in developing their own indigenous flora and fauna plan	SAGCA	GA, ASTMA	2
The sport has limited recent research into the current turf varieties that are emerging into the current market specific to Australia's climate and conditions	Undertake research into emerging/new turf varieties to determine performance and suitability for Australia's climatic conditions	Nationwide research study with a focus on performance, pest and disease tolerance and water use in new and emerging turf varieties	ASTMA	GA	1
Golf courses have an ongoing issue with pest, diseases, and undesirable species, which is hamstrung by the regulation of chemicals	Research into pathology and efficacy of new technology and innovation to deal with pest, disease and undesirable species within constraints of the regulatory environment on chemical usage	Research efficacy of alternative treatment programs for specific pests and diseases	ASTMA	GA	2
It is perceived by stakeholders external to golf that there are better uses of the land we occupy than golf	Assessment of current land usage models and identify areas of opportunity for promotion, multi-purpose use and access	Promote the positive impacts of golf at every level through targeted media campaigns and increase formal studies	GA	AGIC	1

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