

Managing turfgrass on a water allocation

- Kikuyu turfgrass can be managed on a water allocation of 7500 kL/ha per year in Perth in low wear situations; less water will decrease turfgrass colour and growth, particularly during dry summers.
- Dividing an annual water allocation into monthly amounts based on historical monthly evaporation and rainfall data (budget scheduling) is a simple and effective approach to scheduling an annual water allocation.
- Applying an effective wetting agent to Perth's sandy soils improved turfgrass appearance when under two annual water allocations (6250 and 7500 kL/ha per year).

Background

Southern Australia is expected to experience a significant decrease in water resources due to changing climate. Turfgrass managers are under continued pressure to restrict water use, while also maintaining high-quality surfaces. Currently 6750 to 7500 kL/ha per year is allocated to turfgrass managers irrigating public open spaces with groundwater in the Perth metropolitan area. Understanding how to best manage turfgrass on current, and possibly lower future water allocations, is critical for maximising the community benefits of Perth's public open spaces.

Water allocation

Warm-season turfgrasses, such as kikuyu, can be maintained on a water allocation of 7500 kL/ha per year in Perth in low wear situations. This amount is equivalent to replacing about 70% of Perth's net evaporation during the irrigation season (September–April) and is consistent with recommended irrigation requirements for warm-season turfgrasses (Colmer and Short, 2001).

Lowering the water allocation below 7500 kL/ha per year will decrease turfgrass colour and growth, particularly in dry summers (Plate 1). A water allocation of 6250 kL/ha per year can

Table 1. An example of scheduling a water allocation using a 'budget' approach using historical monthly evaporation and rainfall at the UWA Turf Research Facility, Shenton Park.

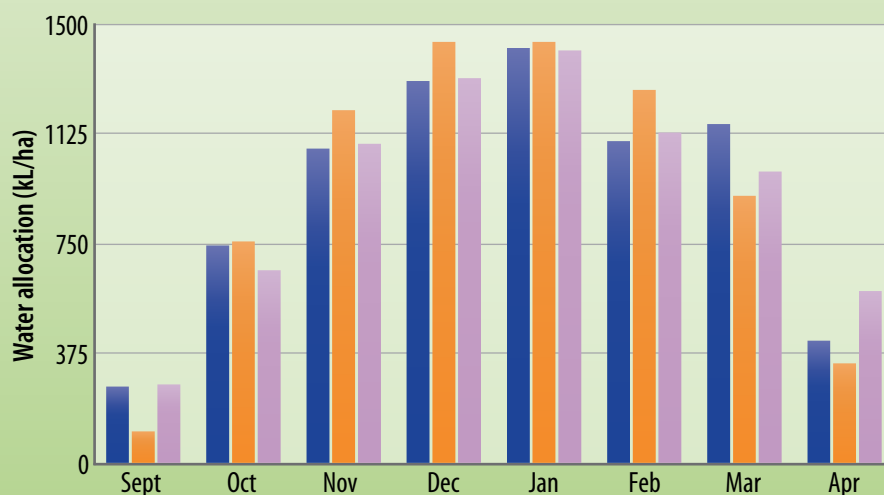
Month	Water allocation (%)
September	4
October	11
November	14
December	17
January	19
February	16
March	15
April	5

maintain acceptable turfgrass in low wear situations and when there is some summer rainfall. A water allocation of 5000 kL/ha per year will result in unacceptable turfgrass colour and poor growth during summer.

Irrigation scheduling

There are a number of options for scheduling a water allocation during the irrigation season. Apportioning water each month based on historical evaporation and rainfall data ('budget' scheduling) is a simple and effective approach to maintaining turfgrass on a water allocation (Table 1).

Refining the budget schedule approach by measuring net evaporation or soil water content may allow turfgrass managers to save small volumes of water to use later in the irrigation season (Figure 1). This can occur when net evaporation (and thus turfgrass evapotranspiration) is lower for some periods than anticipated from historical records.



■ **Budget:** water allocation for each month calculated by multiplying the annual water allocation by the proportion of the annual net evaporation that historically occurred in that month.

■ **Budget refined by net evaporation:** the initial replacement value was the proportion of the water allocation to the net evaporation (historical, as in the Budget schedule) at the start of the irrigation season, but irrigations were based on actual net evaporation for the current season and the allocation remaining was recalculated at the end of each month enabling re-budgeting for remaining months in the current season and with continued adjustments based on prevailing net evaporation.

■ **Budget refined by soil moisture probe:** same as Budget schedule, however irrigation only proceeded if the soil water content was below a critical value.

Figure 1. Monthly irrigation water distributions for the irrigation schedules tested for a water allocation of 7500 kL/ha per year in the 2013/14 irrigation season at the UWA Turf Research Facility.

Role of wetting agents

Applying a soil wetting agent can improve the effectiveness of a water allocation on soils prone to developing water repellency. For two water allocations (6250 and 7500 kL/ha per year) applying a wetting agent markedly improved turfgrass colour during the summer months by decreasing water repellence and increasing soil water content (Plate 1). Although applying a wetting agent decreased water repellence at a water allocation of 5000 kL/ha per year, it did not improve turfgrass colour. This was because the soil water content was still too low to maintain acceptable turfgrass colour.



Plate 1. Turfgrass plots in summer (January 2014). Photos: S. Flottmann

Further reading and references

Barton, L., Colmer, T.D., 2015. Effectively utilising water allocations for managing turfgrass in open spaces. Final Report for Project TU11012, Horticulture Innovation Australia Ltd, Sydney.

Colmer, T.D., Short, D.C., 2001. Reducing water use by turf grasses in a Mediterranean environment: evaluation of diverse species. Final Report for Project TU96002, Horticulture Innovation Australia Ltd, Sydney. ([online](#))

Authors: **Louise Barton** (The University of Western Australia), **Ken Johnston** (Sports Turf Technology) and **Tim Colmer** (The University of Western Australia).

**Horticulture
Innovation
Australia**

This project has been funded by Horticulture Innovation Australia Limited with co-investment from Organic 2000, Sports Turf Association (WA), Turf Growers Association of WA, Cities of Armadale, Belmont, Canning, Cockburn, Gosnells, Kwinana, Joondalup, Melville, Nedlands, Rockingham, South Perth, Stirling, Subiaco, Vincent and Wanneroo, Town of Cambridge, Golf Course Superintendents Association of WA, Golf Management Australia, Golf WA, All Seasons Sanctuary Golf Resort, Bunbury Golf Club, Busselton Golf Club, Cottesloe Golf Club, Lake Karingup Country Club, Mt Lawley Golf Club, Royal Perth Golf Club, Wanneroo Golf Course, Botanic Gardens & Parks Authority, Department of Education, Department of Sports & Recreation, Department of Water, and funds from the Australian Government.

The authors and the participating organisations accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.