



The most cost-effective ways to maintain public open space with less water

Industry Note

Local governments in Perth use groundwater to irrigate high value public open space. Due to a sustained decline in rainfall and decreasing groundwater levels, local governments face the prospect of reduced water allocations. When implementing strategies to reduce water use, cost-effectiveness is an important consideration for councils.

Introduction

Reduced irrigation water available for public open space (POS) due to groundwater depletion is an emerging problem in many urban areas. Local governments in Perth face mounting pressure to maintain high quality POS while being driven to use less groundwater for irrigation. Options are to either obtain irrigation water from alternative sources or reduce water use. A third option is to improve water use efficiency through applying different water savings technologies. Understanding the cost of the options available to maintain POS with less water can help local governments implement water savings techniques that are more cost-effective than alternative sources.

Perth case study

To gain insight into the cost-effectiveness of different water savings techniques for a variety of parks, a case study was undertaken in the City of Nedlands, a local government in metropolitan Perth. The study sample of parks selected represented four parks with a variety of sizes and functions: a sports park, two neighbourhood parks (active/passive use), and a pocket park (see Figure 1).



Figure 1: Map of City of Nedlands depicting study sample of parks © [Department of Water 2014]. Reproduced by permission of DWER. Inset David Cruickshank Reserve (A), Paul Hasluck Reserve (B), Point Resolution Reserve (C) and Genesta Park (D) © [Google maps 2016].

Cost-effectiveness results

The cost-effectiveness of six water savings techniques (see Table 1) were calculated in terms of kilolitres of water saved per dollar spent on the technique, over the lifespan of the technique.

Results of the analysis show that:

1. for each park, cost-effectiveness varies substantially per technique;
2. for each technique, cost-effectiveness varies substantially across park types;
3. all types of works at small pocket parks are relatively cost-ineffective;
4. the broad class of central irrigation control options, including rain shut off devices, tend to be relatively low cost options; and
5. hydrozoning / ecozoning and irrigation system upgrades tend to be relatively high cost options.

For the specific mix of parks in the City of Nedlands, it was found that the average cost of implementing efficiency solutions equivalent to a 5% reduction in water use for POS was \$0.38 per kl; for a 10% reduction in water use it was \$0.43 per kl; and for a 15% reduction it was \$0.62 per kl. This compares favourably to the current backstop solution of maintaining POS following a reduction in groundwater extraction licences, which is to use scheme water that costs \$2.09 per kl.

Table 1. Water savings techniques (Source: Mennen et al. 2017)

Technique	Description
Evapotranspiration-based irrigation scheduling with central irrigation control	Current weather information is collected and used to effectively deliver the amount of water needed into the plant root zone. Using a remote irrigation control system enables shut down when it rains.
Improve soil water properties	Using an effective soil wetting agent decreases the severity and incidence of soil water repellency in turf grown on sandy soils.
Soil moisture sensors	Soil moisture logging probes in/below the root zone can be used to monitor soil profile and enable automatic implementation of irrigation events to match turf water requirements.
Upgrade irrigation system	Upgrading an inefficiently designed irrigation system to provide 85% distribution uniformity.
Hydrozoning and ecozoning	Hydrozoning means using different amounts of water for irrigating different areas within a park depending on use. Ecozones are areas set aside for native vegetation, requiring little or no water.
Rain shut off devices	Irrigation systems are turned off automatically when it rains.

Implications

Each local government area will have their own specific mix of efficiency measures that will deliver the most cost-effective response to a reduction in groundwater extraction limits.

To be cost-effective solutions need to be implemented at scale: the focus for investment should be large parks. The most cost-effective way to achieve a 10% or greater saving will involve a mix of technology solutions, but the technology mix will likely include some form of central irrigation control system that automatically adjusts irrigation settings to reflect changing local weather conditions.

Further reading

Mennen, S., Fogarty, J. & Iftexhar, M.S. (2018). The most cost effective ways to maintain public open space with less water: Perth case study. Urban Water Journal, 15(1), pp.92-96.

Further information



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