

Drought, water restrictions, and community sports fields

By Dr. Robert N. Carrow

When drought conditions are severe enough to result in local water-use restrictions, community sports fields may not be immune from adverse effects of drought. If the state or water district do not have appropriate regulations that allow community sports fields to receive reasonable irrigation during water restrictions, more than the grass on the field is affected.

When severe drought starts to impact states or local communities, a very common theme is for the general public and governmental agencies to impose total water bans on outdoor landscape areas, including community sports fields, as a means to achieve water conservation as well as other visible water-use industries such as car washes and pressure washing. However, when a drought is prolonged the fallacies of this approach become increasingly evident in terms of impact in the community.

Impact can be assessed from several viewpoints, but the most apparent being immediate site users, the players:

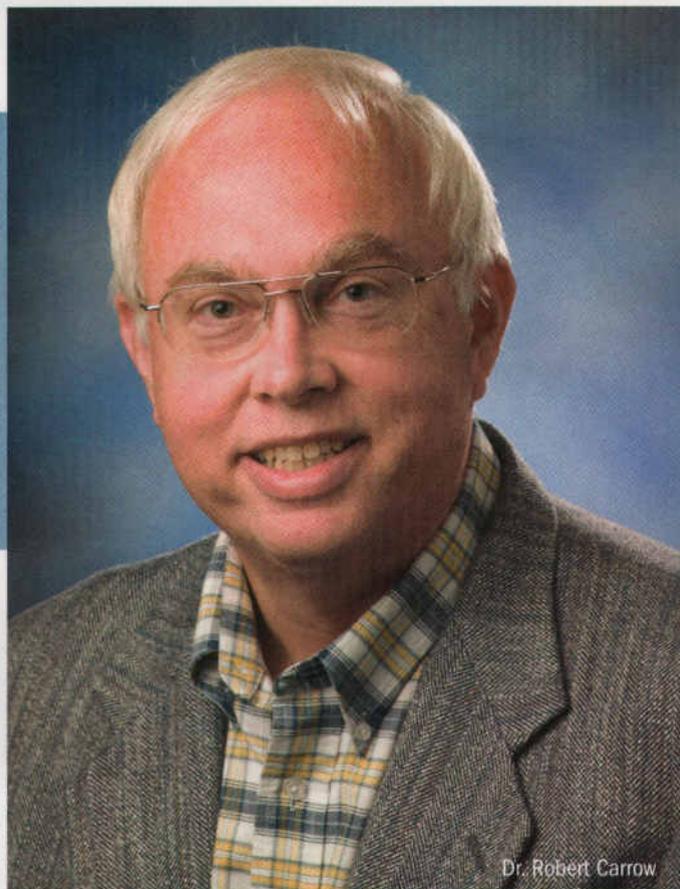
- Hard surfaces increase player injuries; player safety is compromised.
- Field surface conditions of hardness and

unevenness affect the playability for the sport.

- Field conditions continue to deteriorate as turf cover is lost with exposure of the soil surface, which escalates the potential for further injuries.

However, impact is much broader than the immediate site-user and transcends into the local community. Community sports fields, including K-12 sports venues, have substantial positive contributions to society and these are adversely affected by water restrictions that are too harsh to maintain fields in a suitable manner. For example, contributions entail:

- An integral component of community activities for the youth.
- Promotion of physical development and health.
- Enhancing community identity, spirit, and local pride.
- Economic development via creating a community attractive to potential new residents and businesses.
- Economic development through creation of jobs, purchases, provision of goods and services such as sports camps, tournaments, etc.



Dr. Robert Carrow

- Positive activities for youth can translate into safer communities with fewer crimes
- Once the grass cover is lost and the surface conditions deteriorated, restoration of fields is costly and requires considerable time and effort.

Lessons from down under

Experiences in Australia over a 7-year drought period illustrate a positive change in attitudes and actions that can serve as a model for other regions and point to possible proactive actions for the sports community. Drought conditions over much of Australia over the past 7 years have shown: a) the connection between drought and player safety; b) increasing awareness of the extensive influence of drought and total water restrictions on local communities; and c) a shift from total ban on water towards a more "industry friendly" attitude as government officials and the general public came to understand the adverse consequences of the initial actions.

The Municipal Association of Victoria

developed an D Hexcellent resource for positive action that addresses: impacts, field usability, management options, site-specific best management practices (BMPs), and water conservation plans. The BMPs allow controlled irrigation during drought for maintenance of the turfgrass cover and reducing surface hardness. Interestingly, a recent development was the Victorian Government is the \$9.3 million Drought Relief for Country Sports Program for assistance to communities to maintain their community sports activities during prolonged dry periods and avoid the adverse consequences from loss of the fields. These governmental responses during prolonged drought illustrate a progressive attitude and model for maintaining community sports fields and avoiding the adverse economic, job related, and community impacts.

Just as the Victoria experience revealed there is a better plan to deal with drought issues on community sports fields than a total water ban, the Council for Technology and Agriculture (CAST) recently affirmed this in a special publication emphasizing the important of site-specific BMPs for water conservation. Carrow and Duncan explain foundational principals of site-specific BMPs and why it is the "gold standard" for dealing with any environmental issue including water conservation. One foundational principle of BMPs is to use multiple strategies selected from all possible strategies that are the best suited practices for the specific site (e.g. sports field) to address the issue, i.e., the "best" of the "management practices" for the site conditions. Basic strategies for site-specific BMPs on sports facilities are presented in Table 1.

Since water conservation starts at the level of each individual water user or facility, site-specific BMPs implies that each community sports field develop and implement a BMPs water conservation plan. Resources that can assist are: a) the MAV document available on-line; b) the www.GeorgiaTurf.com site, especially the 'Environmental and Water Issues' section which contains basics of BMPs and detailed templates for site-specific golf course and landscape sites that could be adapted for sports fields. The STMA may consider proactively developing a standard template that could be used by any sports facility similar to the template

by Carrow et al. (2) developed for the golf course industry and has been used as a model within certain states.

It is possible to have very good site-specific BMP plans for water conservation, but for it to have little meaning during a drought. It just depends on the nature of governmental regulations, which are either rigid regulations or science-based BMPs. When drought conditions occur, state and local water agencies come under pressure to institute water restrictions. If these regulations are based on the same foundations as site-specific BMPs, water conservation can be

achieved without major adverse economic or functional impacts (Table 2). These types of state or water district regulations are termed "state level BMPs for water conservation." It is important to note that a critical component of a state BMPs plan is that all water users (industrial, commercial, institutional, agricultural, and irrigation landscape water users) must participate by implementing site-specific BMPs.

Waltz et al. developed a model set of state level water restriction guidelines that incorporate BMPs principles and is modeled after the successful SAWS programs. It is informa-

Table 1. Primary Site-Specific BMPs strategies for water-use efficiency and conservation on community sports fields (adapted from Carrow et al., 2007)*.

- Facility Planning and Site Assessment for a Water Conservation Plan. Irrigation audit; intensive site assessment of soil physical and chemical properties and spatial variability; subsurface and surface drainage; evaluate potential irrigation water sources; soil and water quality tests. All water conservation practices implemented in the past or current time period should be identified along with estimated cost in money and labor.
- Site Design for Water Conservation. Includes initial construction aspects: soil modification to allow water infiltration; omitting irrigation on surrounds of recreational facilities where irrigation is not essential; water harvesting and capture from surrounds for irrigation use.
- Use of Alternative Irrigation Water Sources. Includes evaluation of any needs that arise from use of particular irrigation water, especially total soluble salts and/or sodium.
- Irrigation System Design, Installation, and Maintenance for Uniformity of Application and Flexibility. Rain shut-off devices.
- Irrigation Scheduling For Water Conservation: Budget approach to irrigation; implementation of irrigation scheduling plant, soil, or climatic methods by using sensor technology.
- Selection of Turfgrass. Drought resistance; wear/compaction resistance; adapted to climate and site use.
- Additional Management Practices for Water Conservation and Field Safety/Playability. Surface cultivation programs are especially important to capture rainfall, allow efficient irrigation scheduling, and maintain a resilient surface; deep cultivation program to promote deep rooting; traffic plan to prevent undue wear and rutting in localized areas; topdressing to level the field and modify surface conditions; promotion of deep rooting by fertilization, liming, etc.; wetting agents; proper mowing height; consider soil modification or sand-capping if necessary.
- Maintenance Facility/Buildings and General Grounds Water Conservation Strategies.
- Develop Water Plans. Sustainable water use for normal conditions; water conservation plans for drought periods which includes a plan for each water restriction level. During water restrictions, priority areas for irrigation are identified both on the fields and for surrounding areas.
- Benefits and Costs of Regulations for All Stakeholders.
- Education. Internal and Outreach to understand water conservation; implications; and management strategies.
- Monitoring and Modifying the BMPs Plan

*Carrow, R. N., R. R. Duncan, and C. Waltz. 2007. BMPs and water-use efficiency and conservation plan for golf courses: Template and guidelines. Document developed for Golf Course Superintendent Association of American by the University of Georgia. http://www.commodities.caes.uga.edu/turfgrass/georgiaturf/Water/Articles/BMPs_Water_Cons_07.pdf

IRRIGATION & DRAINAGE

tive to note that the SAWS guidelines have water restrictions under even severe drought that allow community sports fields to be used in a safe manner.

How do good BMP-based state, water district, and site-specific water regulations evolve? They do not unless water users are politically involved. A primary hindrance

for progress in developing better state, water district, or local community water regulations for drought periods is simple: the various components of the turfgrass industry do not proactively present a plan.

It is essential that the turfgrass industry, including the sports turf component, proactively address water conservation because it is

an issue that will become increasingly important. Sports associations must start this process and provide foundational resources. ■

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Table 2. Common urban water conservation plan

This is an outline of common State or Water District BMPs for an urban water conservation plan to create a true culture of conservation that encourages voluntary actions by all water users; and with common sense water restrictions and triggers during times of drought that involves all water users. This approach contrasts to a rigid regulation approach with total water bans on more visible water users, while other water users do not participate in water conservation; or rigid regulations that do not consider the economic, job, environmental, and societal impacts.

- Identify water conservation goals—water district level.
- Develop water-use profiles/benchmarking for water users and forecasting for future needs.
- Identify and evaluate all water conservation measures.
- Triggers & Water Restriction Level Regulations.* A good water district BMPs plan must include well-defined, logical water restriction levels with stated triggers to move from one level to another. Usually 1-2 triggers are used and these are well publicized. Both water restriction levels and the requirements for triggers should be consistent with state and water district BMPs practices.
- BMPs for all water-users. All water users must address water conservation and not just the most visible. State-BMP policy must foster site-specific BMPs for all industrial, commercial, institutional, agricultural, and irrigation landscape water users (turf sites with a professional grounds manager such as parks, sod fields, recreational fields, and golf courses). All public owned sites that are irrigated should be models for development and use of site-specific BMPs. NOTE:
 - Pre-emptive laws that do not easily allow local communities to impose more strict water restrictions than allowed at the state or state defined water district level. If local communities can easily impose water restrictions with considering the potential adverse effects (item 9) then there essentially is not functional state or water district plan but a series of every changing local plans.
 - Public Infrastructure improvements to reduce water loss. Public system water audits, leak detection and repair. Public water delivery systems are often the source of major water loss in many urban areas. For golf courses and other water users, water audits, leak detection, and repairs would be part of their site-specific BMPs.
 - Public Infrastructure improvements to foster use of storm water and reclaimed water (treated waste water) for irrigation, fire protection, or other uses. Pipe lines, storm water retention reservoirs for capture and reuse, promote on-site public or private treatment facilities,
- Conservation policies and incentives to promote private infrastructure improvements to reduce water loss, enhance storm water retention and reuse, on-site private waste water treatment for reclaimed water irrigation use. Examples include rebates or grants for conservation devices, systems, and measures.
- Indoor water conservation measures, including all public buildings and facilities.
- Conservation pricing (demand management pricing) with water costs rising above the normal use level for a user that is operating under site-specific BMPs.
- Consideration of all Stakeholders cost and benefits. Evaluation of voluntary and regulated water conservation measures on all stakeholders, i.e., community jobs, economy, environmental. This evaluation should be not only when selecting initial conservation practices but also in terms of how fairly and uniformly different businesses are treated, especially in times of water crisis.
- Policies to encourage alternative irrigation water sources especially by large landscape areas such as sports fields, parks, or golf courses.
- Develop an on-going public information and education program based on a positive attitude that fosters voluntary actions by individuals to achieve water conservation. Avoid making every citizen a "water cop." Conservation plans and programs are long term and their nature influences the community attitudes and actions.
- School based educational programs that foster understanding of BMPs.
- Reasonable monitoring and reporting program that entails all water users. Monitoring requirements should focus on the essential information and not become burdensome for water users by requiring unnecessary information. Overall water-use efficiency and conservation are the important aspects and not monitoring every component within a site-specific BMPs plan. Public facilities should not be exempt from monitoring and reporting.

* Waltz, C., R. N. Carrow, and M. Chappell. 2008. State level BMP water conservation template: Rules for triggers, water restriction levels, and key issues. Document based on the San Antonio Water System regulations. <http://www.commodities.caes.uga.edu/turfgrass/georgiaturf/Water/Articles/State%20Wide%20Templates.pdf>