State Level BMP Water Conservation Template: Rules for Water Restriction Levels and Key Issues

Drs. Clint Waltz, Robert N. Carrow, and Matthew Chappell
College of Agricultural and Environmental Sciences
The University of Georgia

Purpose

This e-Newsletter is a continuation of the e-Newsletter series designed to provide all Green Industries and their respective allied councils a programmatic approach to fostering BMP-based water-use efficiency and conservation plans at the state regulatory (i.e., state or water district levels) and site-specific levels. The previous two e-Newsletters addressed:

- Identifying an overall plan or approach to water-use efficiency and conservation that would be effective within the regulatory realms and on a site-specific basis. The plan presented was a Best Management Practices (BMPs) approach that applies BMPs that have successfully dealt with water quality issues for over 30 years.
- It was emphasized that a successful BMPs approach includes both site-specific BMPs for sites with professional site managers and incorporation of the BMPs philosophy in state or water district regulations. Without an effective plan, water conservation cannot be achieved at a state or site basis without great harm to local and state economies, jobs, and adverse/unintended environmental effects. The aforementioned effects typically result from a more rigid (command and control) regulatory approach.
- Identification of key issues that are important to the Green Industry should be addressed in state or water district regulations. Key issues are normally ones that determine whether the state/water district regulations are truly BMPs-based or a more rigid regulation disguised with a BMPs title.
- Developing a systematic planning process to foster state BMPs that also include site-specific BMPs when appropriate (in this document, when regulations are discussed, this includes the water district level). While there are a number of important components in an overall systematic planning process, it was emphasized that priority #1 was to proactively develop and propose a state BMPs-based water conservation plan that dealt with the key issues for the Green Industry.
- Priority #1 means that this is where the UAC and GAGC must stay on focus. It is not unusual when an industry council is interacting with a regulatory agency or political entity, for these to ask or perhaps even demand information related to water use of certain plants, landscapes, or a number of other questions. These distract from the priority and are unfortunately sometimes asked for that very purpose — to distract from an industry being proactive in helping to formulate policy verses responding to policy. In the early 2000s, when the first state water plan was under discussion, similar questions were asked of traditional agriculture. The reality was that the answers were not available and could only be obtained by the same political and regulatory agencies expending finances, time and effort over the several years needed to obtain the information. There is ample current information to support the BMPs approach for water conservation; and just as with BMPs for water quality, the unanswered questions by government at this time can be addressed by cooperative government and industry efforts over time.

The core of an effective state water plan should be to foster BMPs principles when there is not a water crisis for all water users – i.e. preventative measures. However, a critical part of a state water plan is the nature of regulations that are implemented during a water crisis as each water restriction level goes into effect – i.e. the measures to use during a crisis. **The purpose of e-Newsletter No. 3 is to present a template that focuses on regulations that would be implemented by water restriction level as well as to bring out some key issues of interest to the Green Industry.** A template format allows an item by item review and revision as needed so that at the resulting document covers all key points and concerns. The template we advocate utilizing for this exercise is based on the San Antonio Water System (SAWS) regulations (SAWS, 2008). San Antonio metro area is greatly affected by and also influences the Edwards Aquifer. Thus, the SAWS BMPs based plan reflects a water district approach but can be used as a model for state plans. The SAWS plan is the "poster child" for a successful plan (Kenna and Beard, 2008) and as noted by Finch (2008): "in a climatic area with 32 inches of rain there are many ways to address the interest in lawns and landscapes that result in reduced water use. Science is an ally in the San Antonio experience. An experience that has left quality of life intact, supports a 'growth is good' policy and has reduced per capita water use by 40% in two decades." The SAWS plan is a comprehensive one for residential and landscape water users but it does have short-comings as related to all water users and we have addressed these under the various water restriction level sections.

We are presenting this template not as a final product but as a working draft for the UAC and GAGC to use in their discussions and planning process to evolve a final state BMPs document to proactively take forth to the political and regulatory entities. Some comments on the template information in this e-Newsletter:

- **Much of it has been directly copied from the SAWS web site on their water restrictions by restriction level** (SAWS, 2008; http://www.saws.org/conservation/aquifermgmt/). We encourage readers to go to this site and print out the original water restrictions for comparison with ours in order to see where we have made changes. Our comments are often in italics but changes in specific restrictions are not and can only be identified by comparing to the original.
- It is intended as a working draft for UAC and GAGC to alter and to better address Georgia conditions and industries.
- We have made some changes and added comments to better reflect a true state wide water plan, include some of the key issues facing the Georgia Green Industry and clarify certain areas.
- The material presented below reflects and, in fact, *ARE* a set of water restrictions and we encourage readers to go to the various SAWS sites (home is http://www.saws.org/) and view the many educational, rebate, in-door conservation measures, and other facets of their programs, which should also be additional components of a successful Georgia state BMPs plan – a plan that must have preventative as well as crisis measures related to water conservation.
- **It is our hope that the UAC and GAGC can make improvements and unite on a common plan that incorporates the key issues of both groups, and then take forward a document in a timely manner to the appropriate regulatory and political groups.**

In following sections, water restrictions are presented by water restriction level with comments for some of the items.

Year Around Water Restrictions

Year Round watering restrictions are in effect when the Edwards Aquifer level is above **650 feet** mean sea level at the monitored well. *Note: In this section and the other water restriction levels, note that SAWS uses the Edwards Aquifer level as the "trigger" for which restriction level is in operation. Common sense triggers within a water district are important. These triggers are usually aquifer level, reservoir level, stream flow, or some other water related measurement that is related to the degree of drought stress and can be easily measured and reported within a particular watershed.*

- **Water waste is prohibited** at all times. Allowing water to run off into a gutter, ditch, or drain or failing to repair a controllable leak is considered water waste.

- **Residential, commercial, industrial, and agricultural Edwards Aquifer water users** should use common sense and best management practices to avoid water waste. *Note: State wide or water district conservation regulations must include all water users for a successful long-term plan. The SAWS program emphasizes outdoor water users since the metro area does not include substantial agricultural or industrial components. However, all water users must be involved in a successful plan. Vickers (2002) addresses various water conservation practices for commercial, industrial, and agricultural areas that can be used in state and site-specific BMPs for these entities. In fact, the Green Industry approach of fostering site-specific and state BMPs can serve as a model for the political and regulatory groups to use in encouraging the same process in these other water user areas. This is critical for the Green Industry and the State if fair, successful conservation measures are to evolve that are citizen friendly in terms of economy, jobs, and environment.* ***On-going water conservation is not primarily achieved by water savings during a water crisis (i.e., level 1-3); but by the routine BMPs being fostered for all water users on an indoor, outdoor, manufacturing plant, business facility, etc. basis. As part of developing BMPs for a golf course, production nursery, home landscape, manufacturing plant, bottling plant, etc., the unit defines what practices they can implement year around and when each water restriction level is imposed. If site specific and state BMPs are only for homeowners and the Green Industry in Georgia, then the political and regulatory entities have not achieved an equitable nor effective water conservation plan.***

- **Landscape watering with an irrigation system or sprinkler** is permitted any day of the week between the hours of 8 p.m. and 10 a.m.

- **Hand watering** with a hand-held hose, drip irrigation or bucket is permitted any time of day.

- **Washing impervious cover** such as parking lots, driveways, streets or sidewalks is permitted, but should be done responsibly to avoid excessive runoff.

- **Non-commercial washing of vehicles** and mobile equipment (e.g. washing vehicles at a residence) is permitted any time. Use of an automatic shut-off nozzle or bucket of 5 gallons or less is recommended to prevent water waste.

- **The use of commercial vehicle wash** facilities is permitted any day.

The use of treated wastewater or recycled water is a defense to prosecution under these rules. Year Round restrictions continue until there is an announcement in the newspaper that Stage One is in effect.

Stage One Restrictions

Stage One Restrictions begin when the aquifer level drops to **650 feet** mean sea level at the monitored well.

- **Water waste is prohibited at all times.** Water waste includes allowing water to run off into a gutter, ditch, or drain; or failing to repair a controllable leak.

- **You should reduce water consumption** by any means available.

- **All non-public swimming pools** must have a minimum of 25 percent of the surface area covered with evaporation screens when not in use. Inflatable pool toys or floating decorations may be used.

- **Hand watering** with a hand-held hose, soaker hose, drip irrigation, bucket or watering can is permitted any time and any day.

- **Washing impervious cover** such as parking lots, driveways, streets or sidewalks is prohibited. Health and safety exceptions to this rule may be requested from SAWS in writing.

- **Residential washing of vehicles** or other equipment is allowed only on assigned watering days and times. A hose with an automatic shut-off nozzle or bucket of five gallons or less may be used. Water should not be allowed to run into the street.

- **The use of commercial car wash facilities** is allowed any day.

- **Operators of golf courses, athletic fields and parks** must submit a conservation plan to SAWS. For submittal

Landscape Watering

Watering with an irrigation system or sprinkler is allowed only once a week before 10 a.m. or after 8 p.m. on your designated watering day as determined by your address:

Last Digit of Street Address	Watering Day
0 or 1	Monday
2 or 3	Tuesday
4 or 5	Wednesday
6 or 7	Thursday
8 or 9	Friday
No watering on weekends	

Newly-planted landscapes may qualify for a three-week exemption from the one-day-per-week watering rules. Property owners must mail, fax or e-mail their request to SAWS along with their name, address of the

requirements operators should contact SAWS Conservation Department at 704-SAVE. Golf courses, athletic fields and parks may not irrigate between the hours of 10 a.m. and 8 p.m. *Note 1. Any landscape area with a professional turfgrass manager should have a BMPs plan similar to what the Georgia Golf Course Superintendents Association have developed. This would include sod farms and institutional grounds (ones with professional landscape manager). Note 2. Along with the above turfgrass sites, all water users except the residential area should have science based BMPs plans that are facility wide. Thus, all green industry businesses should have indoor and outdoor (if applicable)BMPs plans but also all other businesses or facilities – industrial plants, bottling plants, state capital grounds, etc. Just as BMPs for protection of water quality (pesticides, pollutants, nutrients, sediment) are required for all potential industries or entities that may influence water quality, the same applies for water conservation BMPs --- i.e. they are not just for some potential polluters or some water users.*

- **Landscape areas on golf courses** not directly "in play" are required to follow one-day-per-week watering based on address unless otherwise instructed by SAWS.

- **Use of fountains, waterfalls**, or other aesthetic water features — outdoors or indoors — is prohibited.

landscape, and date of installation. You may also apply for a variance online.

If your request is approved, you will receive a confirmation letter stating the duration of the permit. Over-seeding existing turf or other landscape is not considered new landscape and will not be given an exemption.

Stage 2 Restrictions

Stage Two Alert begins when the Aquifer level reaches **640** feet mean sea level at the monitored well.

- All restrictions from Stage 1.

- Aesthetic fountains prohibited, unless treated wastewater is used.

- Watering with a hand-held hose or drip irrigation permitted during the hours of 3 a.m. to 8 a.m. and 8 p.m. to 10 p.m. any day.

- Watering with an irrigation system or sprinkler, permitted only once a week on the designated watering day during the hours of 3 a.m. to 8 a.m. and 8 p.m. to 10 p.m.:

Last Digit of Address	Day

0 or 1	Monday
2 or 3	Tuesday
4 or 5	Wednesday
6 or 7	Thursday
8 or 9	Friday

- Filling of new and existing swimming pools is prohibited unless at least 30% of the water is obtained from a source other than the Edwards Aquifer. In addition, refilling is permitted only if it has been drained for repairs.

- Conforming golf courses shall effect a 20% reduction of ET rate. Non-conforming golf courses shall use no more than 1.6 times their base usage. Accompanied by reduced irrigation times. *Note: The terms "20% reduction of ET rate" is not really achievable; but water use can be reduced by a percentage or on an area basis. An approach that avoids listing a percentage is to state what areas are to be non-irrigated or irrigated on a limited scale – i.e., fairways will not be irrigated or irrigated only once every two weeks. Percent reductions are sometimes imposed during crisis situations, especially when an effective state water plan is lacking, but this is not a good method to use on an on-going basis. For example, over the long term a state or water district should foster all water users putting into practice BMPs for water-use efficiency and conservation. This then reduces the periods when a particular water restriction level may be imposed. But, when it does occur, it is best for each water user to put into use those practices or restrictions on water use that they agreed to implement for the particular water restriction level. Those with the best BMPs plan on an on-going basis are most affected by percentage reductions while those with less emphasis on water conservation find it easier to make reductions. One approach could be to allow individual golf course to choose either a percent water reduction or to reduce area to receive routine, frequent irrigation (some may be allowed to keep turf alive – see Level 3).*

- Athletic fields shall reduce water use by an additional 5% from Stage 1 and have on with SAWS an approved conservation plan.

- Non-commercial washing of vehicles is permitted only on the assigned residential landscape watering day & times. Use of a commercial vehicle wash facility is permitted any day.
- *Note: As in level 1 and 3, SAWS level 2 water restrictions do not state what practices would be put into place by commercial, industrial, and agricultural water users when these levels are reached. As previously stressed, all water users must identify practices that are implemented on a year around basis and when specific water restriction levels are reached in a water district.*

Stage 2 restrictions continue until there is an announcement in the newspaper that Stage 2 has been canceled or that Stage 3 is in effect.

Stage 3 Water Restrictions

Stage Three Alert begins when the Aquifer level reaches **630** feet mean sea level at the monitoring well.

- All restrictions from Stage 2.
- Aesthetic fountains prohibited, unless treated wastewater is used.
- Irrigation with a soaker hose, hose-end sprinkler or in-ground irrigation system is allowed every other week beginning on the second Monday after the Stage III has been declared, 3:00 a.m. to 8:00 a.m. and 8:00 p.m. to 10:00 p.m. Handheld hose, drip irrigation system or 5 gallon bucket Tuesdays, Thursdays, Saturdays during Stage III hours. *Note: Water to maintain the viability of trees and shrubs is important. San Antonio with much less rain and longer periods of drought than typical for Georgia has recognized that long-term presence of landscape plants is important. In Georgia, similar use of irrigation, especially for trees and shrubs, is encouraged. In the case of established turfgrass, bermudagrass and centipedegrass can survive under dormant conditions for several weeks, zoysiagrass and tall fescue can also survive in dormant state, but for somewhat shorter periods than bermudagrass or centipedegrass. The same holds true for ornamental plant material, whereby differences exist in the drought tolerance of differing species and cultivars. Irrigation by hand hose (under the conditions noted above) would allow some water on the driest areas of small lawns to prevent undue grass or ornamental plant loss. Some irrigation with sprinklers, perhaps every 2ed or 3rd week would allow survival of most plant material during prolonged drought periods. During a water crisis, without an effective state/district water conservation plan the norm is to impose a total outdoor water ban. Yet with a good plan in place all water users are using a BMPs philosophy to reduce water use and, therefore, the harsh impositions that cause job, economic, environmental, landscape or other losses should no longer be needed.*
- Watering newly planted landscapes permitted only with a variance from the SAWS' Conservation Department. *Note: It would be better to develop some common sense guidelines or establishment of newly planted landscape plants that to have a vague statement such as the SAWS one. This is important especially for the northern half of Georgia with its rolling terrain and soils susceptible to erosion – i.e., causing sedimentation loads in streams and water bodies. As learned and documented in the late 1930's and 40's, grasses are the most effective landscape plants for protecting soils – an essential natural resource. In terms of newly planted sod, which is the most effective ground cover for immediate protection of soils against erosion, it is important to recognize that light irrigation may be required 2 to 3 times daily for the first 1 to 2 weeks until roots are initiated. Areas that have lost ground cover and are susceptible to soil loss should receive priority for protection from erosion.*
- Conforming golf courses shall effect a 10% reduction of ET rate. Non-conforming golf courses shall use no more than 1.8 times their base usage. *Note: See comments in the Stage 2 water restriction section. Under severe water crisis, instead of only a percent reduction, golf courses may have the option of a reducing frequency of irrigation and/or*

area to achieve an acceptable level of water conservation. State water planners must be careful to not select certain industries for more harsh water restriction levels based on someone's perceived idea of what is "not critical". In a truly dire water crisis, this approach would likely lead to the identification of the major water users as the ones to restrict water availability – and this is commonly the largest industries in the community and not Green Industry businesses or golf courses.

- Athletic fields shall reduce water use by an additional 5% from Stage 1 and have on with SAWS an approved conservation plan. *Note: It is informative to note that SAWS does not eliminate irrigation on community sports fields and that water restrictions are rather limited. When irrigation is with-held from sports fields they become hard and player injuries increase. The prolonged drought in Australia has resulted in considerable concern on this issue. MAV (2007) provides an excellent detailed discussion of the problems and potential solutions for community sports fields and programs.*

- Non-commercial washing of vehicles is permitted only on the assigned residential landscape watering day & times. Use of a commercial vehicle wash facility is permitted any day.

- Water runoff onto streets is prohibited.

Last Digit of Address	Day
0 or 1	Monday
2 or 3	Tuesday
4 or 5	Wednesday
6 or 7	Thursday
8 or 9	Friday

Stage 3 restrictions continue until there is an announcement in the newspaper that Stage 3 has been canceled.

Conclusion

The motivation for presenting this template based on the SAWS program is to give a draft for the Green Industry to use as a grid for developing a similar document with appropriate alterations for Georgia. The SAWS program emphasizes residential and outdoor water user practices under different water restrictions; and on their web-site they encourage indoor water conservation measures. The SAWS program does not emphasize the importance of all water users (commercial, industrial, agricultural) participating in a BMPs manner. Some "key issues" discussed in e-Newsletter #1 and incorporated to some extent in the text of this document related to various water restriction levels are:

- Need for identification and implementation of common-sense triggers going into and out of a particular water restriction level that are based on real-time resource levels.
- Nature of water use restrictions at each restriction level.

- Reasonable landscape (outdoor) restrictions that do not cause undue loss of expensive plant material (turf and ornamental plants).
- Reasonable regulations to allow plant establishment to prevent potential soil erosion and deterioration of water quality due to sediment pollution.
- Reasonable water restrictions for community sports fields.
- Requirement for all water users to develop BMPs that denote practices to be implemented at all times; including non drought conditions to the most severe water restriction level.

Other key issues, some were noted in e-Newsletter #1, but not addressed in this article are:

- Where is the real decision-making level? State regulations should have preemptive laws that do not allow local communities to institute regulations more rigid than the water district restrictions or to go into a different restriction level without appropriate triggers.
- Monitoring requirements should be reasonable and not focus on individual practices that result in multiple and costly types of information gathering.
- Educational and research needs. Similar to the BMP approach used for clean water protection, a BMPs approach requires on-going educational and research efforts with the educational needs at many different levels. As with water quality BMPs, all research/science questions for water quantity cannot be addressed before implementation of a state water plan, but will merit attention over time. Within the various components of the Green Industry, the UGA College of Agriculture and Environmental Sciences research, extension, and instructional programs can address many of these needs in conjunction with each component of the Green Industry. However, the state/water district must recognize the costs and support these requirements in terms of research, education, incentives, etc.
- Revision and improvement. As with any plan, there should be opportunity to review and revise water plan aspects over time and make adjustments. This should be encouraged by state political and regulatory groups.

Table 1 from e-Newsletter #1 is repeated at the end of this article as a summary of the common components that a State BMPs plan should include – these go beyond the Green Industry to all water users. The Green Industry should be familiar with these common components and include their concerns, questions, and support as they develop a proposed state water conservation plan specific to the Green Industry.

References.

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Table 1. This table contains an outline of common **State BMPs** for an urban water conservation plan. See www.GeorgiaTurf.com; Environmental and Water Issues section; eNewletter 1 for references for this table..

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1. Identify water conservation goals.
2. Develop water-use profiles for water users and forecasting for future needs.
3. Identify and evaluate all water conservation measures across all users.
4. With consideration of items 1-3, develop a community or water district BMPs plan including 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.
5. Information source – i.e., identify the decision-making individual or office that can address question relative to water management regulations in the water district.
6. Infrastructure improvements. 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.
7. Indoor water conservation measures, including all public buildings and facilities.
8. Conservation pricing with water costs rising above the normal use level for a user that is operating under site-specific BMPs.
9. Stakeholder 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.
10. Encourage alternative irrigation water sources especially by large landscape areas such as golf courses.
11. Consider potential for water conservation incentives such as rebates for conservation devices, systems, and measures.
12. 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.
13. School based educational programs that foster understanding of BMPs.
14. Foster development of site-specific BMPs for all industrial, commercial, institutional, agricultural, and irrigation landscape water users. See Table 2 and Carrow et al. (2005b; 2007) for components or strategies within a site-specific BMPs plan. All public owned sites that are irrigated should be models for development and use of site-specific BMPs.
15. Develop a 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.
