

Water Conservation Best Management Practices

# Understanding Best Management Practices

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## 1.0 Introduction

The following is an update to the introduction in the original (November 2004) Texas Water Development Report 362 Water Conservation Best Management Practices Guide (Guide).

The Guide was the result of the work of the Texas Water Conservation Implementation Task Force (Task Force), a volunteer group of Texas citizens with experience in and commitment to using Texas water more efficiently. The Task Force was created by the 78th Texas Legislature in 2003 pursuant to Senate Bill 1094.

In addition, the 78th Legislature passed House Bill 2660, which charged the Texas Water Development Board and the Texas Commission on Environmental Quality to develop water conservation programs for different types of water suppliers that suggest best management practices for achieving water conservation. The Task Force was charged with reviewing, evaluating, and recommending optimum levels of water use efficiency and conservation for the state. Texas Water Development Board Report 362 Water Conservation Best Management Practices Guide (Guide), released in November 2004, was prepared in partial fulfillment of this charge.

The Task Force also recommended that a permanent standing Water Conservation Advisory Council (Council) be established to advise the legislature as well as other state agencies on matters regarding water conservation. In 2007, the 80th Legislature, via passage of Senate Bill 3 and House Bill 4, established the Council. The legislature directed the Council to address several charges including:

Charge 2: Monitor new technologies for possible inclusion by the Texas Water Development Board as best management practices in the Best Management Practices Guide developed by the Water Conservation Implementation Task Force

Working with the Texas Water Development Board and the Texas Commission on Environmental Quality, the Council established a stakeholder process to review and revise best management practices. Changes to the Guide are vetted by all appropriate subject matter experts, interest groups, and state agencies. The intention is that it remain a living document that incorporates changes or additions on an ongoing basis. Periodic solicitations will be made to encourage reviews by the user community. As appropriate, the Council makes recommendations for revisions to the Guide.

After reviewing the recommendations from the Council, and in consultation with the Texas Commission on Environmental Quality, the Texas Water Development Board develops appropriate changes to the best management practices and updated versions of the Guide results from these efforts.

## 1.1 Background

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Municipal water conservation efforts in Texas have been motivated by diverse goals such as preventing land subsidence, addressing short or long-term water shortages, providing environmental protection, and avoiding or postponing the high costs of new water system improvements. Through implementation of water conservation programs across the state, experience has been gained in the effective delivery of programs and lessons learned in actual conservation efforts.

Industrial water users have also made advances in water use efficiency over the past several decades. Inspired by increasing costs of resources, such as the water itself, energy needed to pump, treat, and heat water in industrial processes, and the challenges of drought, many Texas businesses have developed or adopted techniques to lower water use.

Agricultural growers using groundwater from the Ogallala Aquifer have pioneered water efficiency in agricultural irrigation in the Texas panhandle region. As early as the 1970s, low-pressure center pivot irrigation systems were reducing water use by 30 percent to 50 percent from existing irrigation methods at the time. Since then, irrigation efficiency has increased both in the sophistication of low pressure irrigation methods as well as increased efficiency in other irrigation and water management methods in agricultural production.

While there are a number of successful conservation efforts in Texas, there is an opportunity for a more comprehensive effort by all water use sectors in the state. One of the Guide's objectives is to gather information about the elements of successful conservation programs, good cost estimates, and reliable water savings estimates for use in water resource planning. In the Guide the following working definition of "conservation" is utilized:

"Those practices, techniques, programs, and technologies that will protect water resources, reduce the consumption of water, reduce the loss or waste of water, improve the efficiency in the use of water, or increase the recycling and reuse of water so that a water supply is made available for future or alternative uses."

Experience in water conservation program implementation over the decades has resulted in a body of knowledge in Texas, across the United States, and around the world. Practitioners have shared these experiences and adopted the approach that a best management practice is structured for delivering a conservation measure or series of measures that is useful, proven, cost-effective, and generally accepted among conservation experts.

In Texas, water conservation best management practices are designed to fit into the state's water resources planning process as strategies to help meet future water needs. As a result, each best management practice should be clearly defined in its schedule of implementation, expected water savings, and costs of implementation. Each best management practice has several elements that describe the efficiency measures, implementation techniques, schedule

of implementation, scope, water savings estimating procedures, cost effectiveness considerations, and references to assist end-users in implementation.

## 1.2 Development and Purpose of Best Management Practices Guide

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The best management practices in this Guide are offered to the state's regional water planning groups, water providers, and water users as a tool for planning and designing effective water conservation programs. The revised Guide is organized into five sections for municipal, industrial, agricultural, wholesale, and commercial and institutional water user groups. At the end of each section is a chapter giving guidance on cost-effectiveness evaluation for the best management practices. Each best management practice is organized to be of assistance in conservation planning, program development, implementation, and evaluation.

Best management practices can be evaluated for potential water savings and the cost effectiveness for consideration in the regional water planning process. Within each planning region, sufficient variation exists at the local water user level that more specific analysis should be done by a prospective end-user prior to adopting the practice. Best management practices in this Guide are voluntary efficiency measures that are intended to save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe. The best management practices are not exclusive of other meaningful conservation techniques that an entity might use in formulating a state-required water conservation plan. At the discretion of each user, best management practices may be implemented individually, in whole or in part, or be combined with other best management practices or other water conservation techniques to form a comprehensive water conservation program. The adoption of all or part of any best management practice is entirely voluntary, although it is recognized that once adopted as part of a water conservation program, the entire water conservation program including certain best management practice elements may have some regulatory aspects to them (e.g. implementation of a local city ordinance).

Each best management practice is organized into nine standardized sections, which are described in general terms below.

### *Applicability*

The specific type of water user group that could potentially benefit from the best management practice is described, as are the general goals for water efficiency that the practice addresses.

### *Description*

This section provides an explanation of the specifics of the conservation measure(s) included in the best management practice. This section provides information that should assist the user in determining cost effectiveness and applicability of the practice. Often a best available practice may not yet be cost effective to be implemented by all water users. Highly efficient water conservation measures that will produce cost-effective results are mentioned.

### *Implementation*

The basic steps to accomplish the best management practice are described in this section. If the description section includes more than one measure to complete the best management practice, the implementation section will suggest necessary steps for achieving the water savings.

### *Scope and Schedule*

In best management practices which have multiple implementation steps, a recommended schedule for implementation is included. In general, planning, data gathering, and evaluation steps should be accomplished within 12 months of adoption of a specific best management practice. For simpler best management practices, the scope is complete when the steps described in the implementation section have been achieved. For more complicated best management practices, the scope indicates the level of implementation necessary to consider the best management practice complete. Where different levels of implementation or constraints are present, these are described.

### *Measuring Implementation and Determining Water Savings*

To track the progress of a best management practice, the water user should collect certain data to document progress implementing the best management practice and evaluating actual water savings. This section identifies the recommended data, the information to calculate water savings from implementation of the best management practice, and may include statistical or mathematical formulas when appropriate.

### *Cost-Effectiveness Considerations*

Basic costs of implementing the specific best management practice are explained. Due to the wide variety in actual costs based upon size of program and location, ranges of costs are given where appropriate. In many cases, costs and expenses can be reduced or spread out when multiple best management practices are implemented by an entity. This section primarily serves to remind the users of costs to consider when performing a cost-effectiveness analysis.

### *Determination of the Impact on Other Resources*

This section serves to provide a generalized identification of other resources that are either required or saved by the implementation of this best management practice. Specifically, related energy savings might easily result from a reduced water demand as well as lower infrastructure capital costs and annual maintenance and equipment.

### *References for Additional Information*

The best management practice concludes with a listing of resources that can assist a water user in implementing the best management practice.

### *Acknowledgments*

This section may include a brief listing of associations, groups, and organizations that were involved in the development and review of the particular best management practice.

## 1.3 Cost-Effectiveness Considerations

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Each of the five sections of the Best Management Practices Guide, the municipal, industrial, agricultural, wholesale, and commercial and institutional uses has a dedicated chapter on cost-effectiveness analyses. Methods for determining the relationship between the value of water saved and the cost of best management practices implementation are described and explained through examples. Users of the guide are encouraged to read and utilize any of the analytical tools found in these sections.



## 1.4 Getting the Most Out of the Guide

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The Best Management Practices Guide is designed for several uses and for a diverse audience of water resource planners and managers throughout the state. It has sufficient detail to be useful in the state water planning process, which is implemented at the regional level. The regional water planning groups are encouraged to review the best management practices and to consult with water user groups in their region that have an identified future need for water to determine which best management practices are appropriate and which best management practices the water user groups intend to utilize or are already using for conservation program planning and implementation. For planning purposes water conservation best management practices are not limited to those listed in this guide.

Efficient use of water as a natural resource is an important planning objective and an economical means of operation and recommended that water user groups of all types evaluate the best management practices for use in their area. The first step for a municipal, agricultural, commercial and institutional, or industrial water user or a wholesale provider is to review the Applicability section in a best management practice to determine if it is appropriate for their use. For those water users with stakeholders, a stakeholder involvement process is a valuable means of getting feedback on priority best management practices and on specific elements within a best management practice which have broad support. In municipalities, stakeholders include customers and representative interest groups which have shown an interest in water issues in the community. Such groups may include representatives from neighborhood and business associations, technical groups, academics, environmentalists, and city departments. A number of the municipal best management practices recommend developing such stakeholder groups as a part of implementing a specific best management practice. Stakeholder groups can be helpful in the initial selection of best management practices to be included in a conservation plan.

Industrial water user groups should consider employees from all affected departments, customers, suppliers, and regulators and impacted water users, including agricultural or municipal interests, as potential stakeholders. Depending upon the size of the business and the proposed best management practices, the process can be either formal or informal. The industrial water user group can also use the guidance included in the employee programs best management practice as part of the process of selecting the appropriate best management practices. For those industrial water user groups that are already implementing an environmental management system practice, the stakeholder process may be defined and can be used to help pick the appropriate best management practices. In the industrial setting, the executive management support practice is essential for success and should be sought early in the planning process.

Agricultural water user groups at the farm level may include employees, suppliers, and regulators among potential stakeholders. A valid input process may be an informal survey of individuals to solicit input for choosing the best management practices. For political

subdivisions of the state of Texas that deliver irrigation water to agricultural users, the stakeholder group may include representatives from agricultural and water conservation organizations, municipal, and rural water supply entities, and local, state, or federal governmental agencies.

In writing a conservation plan it is important for the water user group to follow state, local and, in some cases, federal guidelines which may include requirements for certain plan elements such as a utility profile and seasonal demand. Such requirements are often specific to the water user group, the type of water demand, and the political boundaries in which a water user group operates. Texas has numerous groundwater districts, river authorities, and irrigation districts, all of which have specific authority and the potential for unique requirements within their area or operation. Best management practices are designed to be used as a resource in developing that part of a water conservation plan where specific measures, the schedule and scope of implementation, and the anticipated savings and costs are addressed.

Each best management practice was prepared through research of literature and with the insight and experience of knowledgeable stakeholders to provide information based upon real world results of conservation program implementation. Because of the information accumulated in the development of the Guide, each best management practice can serve as a program guide as well as a planning tool. Conservation program managers wishing to use the best management practices in program delivery should pay close attention to the Implementation, Schedule and Scope, and Measuring Implementation sections. Each of these sections contain information which can assist existing conservation programs as well as new conservation efforts to increase their effectiveness. There is also a reference section with additional resources to assist conservation practitioners in delivering high quality programs with real water savings.

The best management practice also has information that can assist managers, auditors, and policy makers in evaluating the impact of conservation programs. The Measuring Implementation, Determination of Water Savings, and Cost-Effectiveness Considerations sections are provided to assist in program evaluation. Each section for municipal, industrial, agricultural, commercial and institutional, and wholesale uses has a Cost-Effectiveness Considerations chapter, which provides tools for doing cost-benefit analysis by each of the major types of water user groups.

This Guide is presented as a tool for advancing the practice and effectiveness of water conservation in Texas. The insights distilled in the enclosed best management practices come from years of experience with conservation practices. That same experience leads to view this as a living document, with the recognition that further implementation of conservation practices will bring new insight, more study will provide new information, and new technology will improve savings. Conservation managers, planners, practitioners, and policy makers are encouraged to give feedback to the Texas Water Development Board about the Guide in the hopes that it will be updated regularly over the years ahead.