

# **Florida's Public Supply Water Conservation Performance Measurement System**

Prepared for:

Florida Department of Environmental Protection

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March 2005

Prepared by:

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A report funded in part by the Florida Department of Environmental Protection, Florida Coastal Management Program, pursuant to National Oceanic and Atmospheric Administration Award No. NA03NOS4190079. The views expressed herein are those of the author and do not necessarily reflect the views of the State of Florida, NOAA or any of its subagencies.

March 2005

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## Section 1.0

### Project Background

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Florida is the fourth most populous state in the U.S. and the largest user of irrigation water east of the Mississippi. As the state continues to grow, so does the demand for fresh water. From 1995 to 2020, the estimated demands are expected to increase from 7.2 billion gallons a day to 9.1 billion gallons per day, a 26% increase. Public water supply currently represents the second largest use segment in Florida. Failure to use water efficiently will further put at risk the state's valuable natural systems.

In response to the state's growing need for water, and an historic drought experienced throughout most of Florida from 1999-2001, the Florida Department of Environmental Protection (FDEP) led the development of a Florida Water Conservation Initiative (WCI) with a report published in April 2002. The report contained 51 recommendations to be considered to achieve improved water-use efficiency. The Statewide Comprehensive Water Conservation Program for Public Water Suppliers, as part of the implementation phase of the WCI, has several related elements:

1. Development of consistent performance measures for water conservation programs and the subsequent development of goal-based approaches to water conservation programs.
2. Development and maintenance of a Florida-specific water conservation guidance document to assist public water suppliers in the design and implementation of utility-specific water conservation programs.
3. Development of a statewide database and clearinghouse on water conservation to receive, store, analyze, and disseminate information on water conservation program effectiveness.

The development of performance measures will be a key element of the overall Statewide Comprehensive Water Conservation Program for Public Supply. This Program will allow utilities to develop creative, utility-specific, goal-based alternatives to the current standard consumptive use permitting requirements of the water management districts, provided the alternative goal-based approaches are found to promote conservation at least as well as standard requirements.

In order to achieve these objectives, the state water management agencies and professional water management organizations joined together and drafted the Joint Statement of Commitment for the Development and Implementation of a Statewide Comprehensive Water Conservation Program for Public Water Supply. The Joint Statement of Commitment (JSOC) was signed into effect in January 2004. The JSOC signatories include the

FDEP, the South Florida Water Management District (SFWMD), the Southwest Florida Water Management District (SWFWMD), Northwest Florida Water Management District (NFWMD), the Suwannee River Water Management District (SRWMD), the St. Johns River Water Management District (SJWMD), the Florida Public Service Commission (PSC), the Utility Council of the American Water Works Association, Florida Section; the Utility Council of the Florida Water Environment Association, and the Florida Rural Water Association.

The Work Plan for JSOC includes four major tasks with work groups assigned to each task. The tasks are to:

- A. Develop standardized conservation definitions and performance measures to assess and benchmark the effectiveness of water conservation programs and practices;
- B. Establish a clearinghouse for water conservation programs and practices;
- C. Develop a Water Conservation Guidance Document for public water supply; and
- D. Implement pilot applications of elements of the program (and the entire program upon completion of the document).

The FDEP contracted Hazen and Sawyer on July 1, 2004 (DEP Contract No. WM873) to develop a compendium of standardized water conservation definitions and performance measures. The work was subsequently sub-contracted to Malcolm Pirnie, Inc. Definitions and performance measures identified and evaluated in this final project report were developed to become a component of the Clearinghouse and will be included in the Guidance Document. They will also form the basis for evaluating goal-based water conservation plans and be used to evaluate the effectiveness of conservation programs.

The goal of this project was to develop consistent performance measures for water conservation programs and ultimately to develop a Statewide Water Conservation Performance Measurement System for Public Water Supply to:

- Contain a common framework of water conservation definitions and performance measures;
- Contribute to the development of improved regulatory approaches for public water supply conservation requirements;

- Assist in the development of quantitative, goal-based approaches to water conservation for public water supply; and,
- Serve as the essential structure necessary for the development of the Water Conservation Clearinghouse.

Copies of this publication are available from the Florida Department of Environmental Protection, Office of Water Policy, 3900 Commonwealth Boulevard, MS#45, Tallahassee, Florida 32399-3000.

## Section 2.0

### Introduction

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Florida has become increasingly interested in water conservation performance measurement and more specifically, integrating performance measurement with strategic planning. The purpose for developing a statewide integrated strategic planning and performance measurement system for water conservation is to improve current statewide water management programs and policies.

In general, developing an integrated strategic planning and performance measurement system consists of the following components and considerations:

- Standardized performance measures;
- Conceptual framework that represents a comprehensive performance measurement system;
- Effective internal and external communication to ensure system success;
- Accountability for results must be clearly assigned and well-understood;
- Systematic performance measurement should be positive, not punitive;
- Performance data must be collected, analyzed and reported;
- Performance measurement system that provides valid and useful information for decision makers, not just compiled data; and
- Measures should reflect goal attainment of utility programs.

These considerations are reflected in the development and planned implementation of Florida's Public Supply Water Conservation Performance Measurement System as described below:

- The Water Conservation Clearinghouse will be the means by which performance data is collected, analyzed and reported. Based on Clearinghouse findings, the Performance Measurement System will be refined and updated.
- This report establishes a suite of performance measures to be used as appropriate, at the district and utility level;
- Recommended performance measures are shown relative to a conceptual framework;
- The Statewide Water Conservation Program includes a communication and outreach focus group that spearheads journal publications and presentations;
- Regulatory approaches to implement the Performance Measurement System and establish accountability for performance are recommended in this report, for further consideration during development of the Water Conservation Guidance Document;

- The Program's results will be shared with all stakeholders through the Clearinghouse; and
- The Clearinghouse will verify, catalog and report the water conservation information.

The first step is to establish performance measures. A literature search revealed that although there is relatively widespread usage of performance measures by federal agencies, a limited set of water conservation performance measures exists. Several federal agencies publish glossaries of performance terms and definitions. However, those definitions tend to be intensive and typically reflect requirements of the Strategic Plan that is mandated for federal agencies by the Government Performance and Results Act of 1993. Furthermore, there is a broad range of performance measure definitions. For example, the National Oceanic and Atmospheric Association's definition of a 'performance measure' includes four components: (1) indicator; (2) unit of measure; (3) target and (4) baseline. The U.S. Governmental Accounting Standards Board uses 'performance measure' and 'indicator' interchangeably, while the U.S. Office of Business Management defines a 'performance measure' as a performance goal or indicator. This inconsistency among terms and definitions justifies the need to establish standardized water conservation performance measurement terms and definitions to implement the Florida-based Program.

**Performance measurement terms and definitions recommended in this report are intended to be simple to understand and apply.** Broad performance measurement terms are defined below and also appear in the Florida Water Conservation Glossary (Appendix A).

<b>Baseline:</b>	An established value or trend used for comparison when conditions are altered, (e.g., introduction of water conservation measures).
<b>Benchmark:</b>	Expected performance of a best management practice or water conservation measure.
<b>Performance Indicator:</b>	A program characteristic or component that indicates effort expended to achieve a goal or set of goals.
<b>Performance Management</b>	The systematic process of establishing goals and corresponding performance measures that reflect goal attainment, monitoring results of activities; collecting and analyzing performance information to track progress toward planning results; using performance information to improve program decision-making and resource allocation; and communicating results achieved, or not attained.
<b>Performance Measure</b>	A quantitative or qualitative characterization of performance.
<b>Water Conservation Goal:</b>	The desired level of water-use efficiency to be reached and/or maintained.
<b>Best Management Practice:</b>	A water conservation measure or system of business procedures that is beneficial, empirically proven, cost effective, and accepted in the user community.

## Section 3.0

### Project Methodology

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Project methodology consisted of developing water conservation terms and definitions, surveying water management districts and utilities to determine performance measures and regulatory approaches that are in use, and recommending regulatory approaches for implementing a goal-based water conservation program that includes a suite of integrated performance measures organized in a framework that shows how they are used.

#### 3.1 Development and Refinement of the Terms and Definitions

JSOC members provided an extensive list of terms/definitions to serve as a starting point to develop the needed terms/definitions. Many of the terms were peripheral to water conservation and were removed from the list by consensus via a teleconference.

The list was expanded (named the Long List) by conducting a literature review. The Long List was then redeveloped to short-list recommended terms and definitions. The Short List was subsequently named the Florida Water Conservation Glossary. The Glossary and the original Long List are provided as Appendix A and B, respectively. A “comments” column on the Long List explains why terms/definitions were chosen over others, and how recommended terms/definitions vary from the original source.

The Glossary was updated several times to reflect WMD and utility survey results and JSOC meeting discussions. Since the Long List and the Glossary (first draft) were first delivered to the FDEP on August 31, 2004, only the Glossary has been modified. Therefore, some terms and definitions in the Glossary do not appear in the Long List. The Glossary also includes acronyms, where appropriate.

#### 3.2 Water Management District and Utility Survey Tools

Hazen and Sawyer polled water management districts and a sample of individual utilities serving urban, rural, coastal and interior service areas in the northern, central and southern regions of the state. The purpose of the survey was to identify existing water conservation performance measures in use; water management districts water conservation reporting requirements by rule, by specific permit condition(s) as part of Water or Consumptive Use Permits (WUPs/Cups) and for cooperative funding; and calculations and uses of per capita water use. Development and delivery of the WMD and utility survey tools follow and their results are discussed in Chapters 4 and 5, respectively.

### **3.2.1 Development of the Water Management District Survey Tool**

The survey tool that was developed for the WMDs included the following sections:

- A. General Information – Respondents were asked for their contact information;
- B. Public Supply Conservation Reporting Required by WMD;
- C. Public Supply Conservation Reporting in order to Receive Funding from WMD;
- D. Public Supply Conservation Requirements through WMD Rules and Permit Conditions;
- E. Per Capita – Respondents were asked questions regarding the use of gallons per capita as a performance measure and how it is calculated; and
- F. Miscellaneous Questions – Respondents were asked general questions regarding performance measures that they felt were best for evaluating the effectiveness of a conservation program when the goal was volume-based and when the goal was cost-based.

### **3.2.2 Development of the Utility Survey Tool**

The survey tool that was developed for the utilities included the following sections:

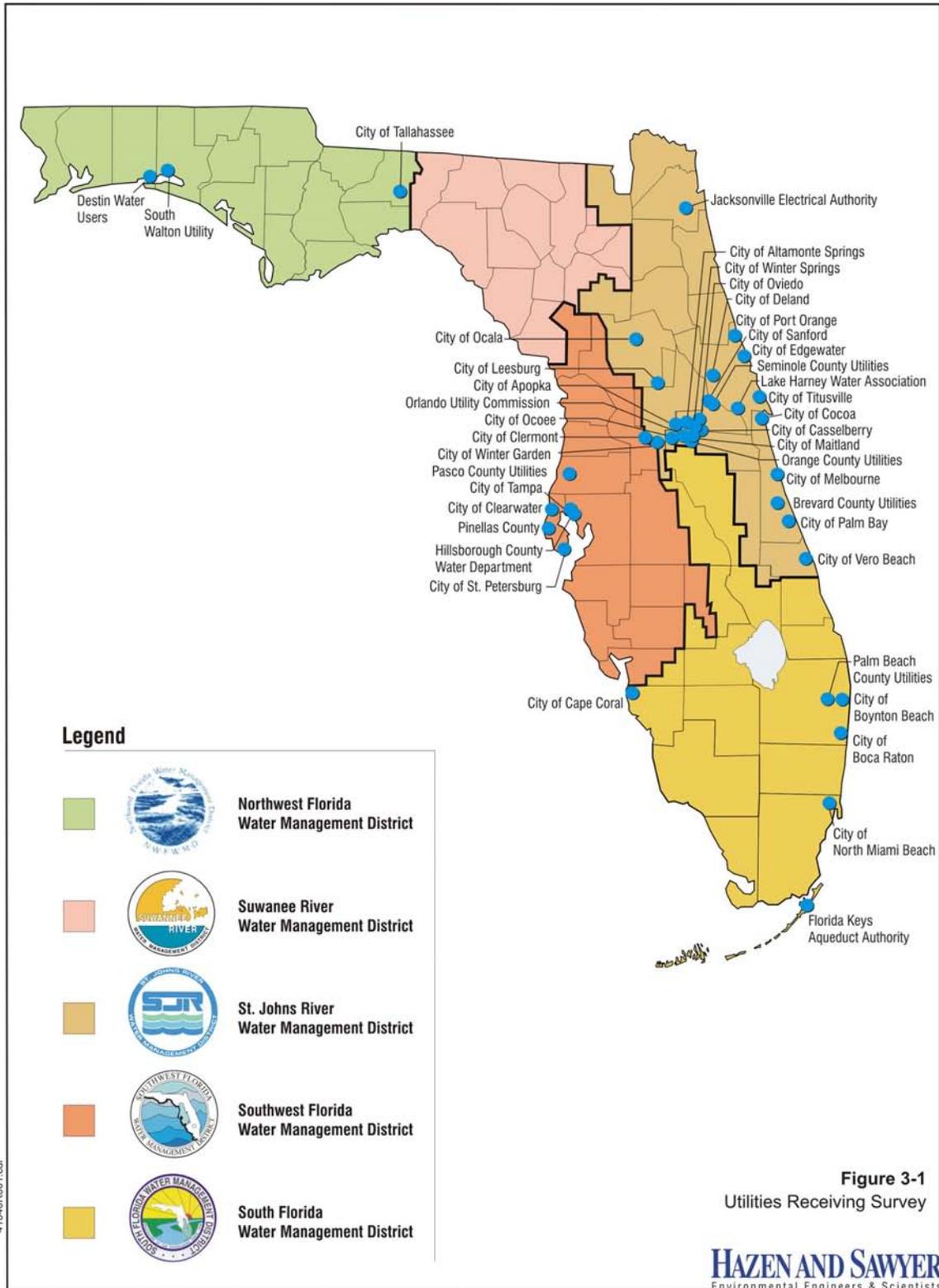
- A. General Information - Respondents were asked for their contact information and what WMD they were located in;
- B. Public Supply Conservation Reporting Required by WMD;
- C. Public Supply Conservation Reporting in order to Receive Funding from WMD;
- D. Utility Evaluation of Conservation Programs Implemented – For each conservation program or BMP, the utilities were asked to describe the program, why the program was implemented (permit condition), how savings were tracked and what performance measures were used to evaluate the program;

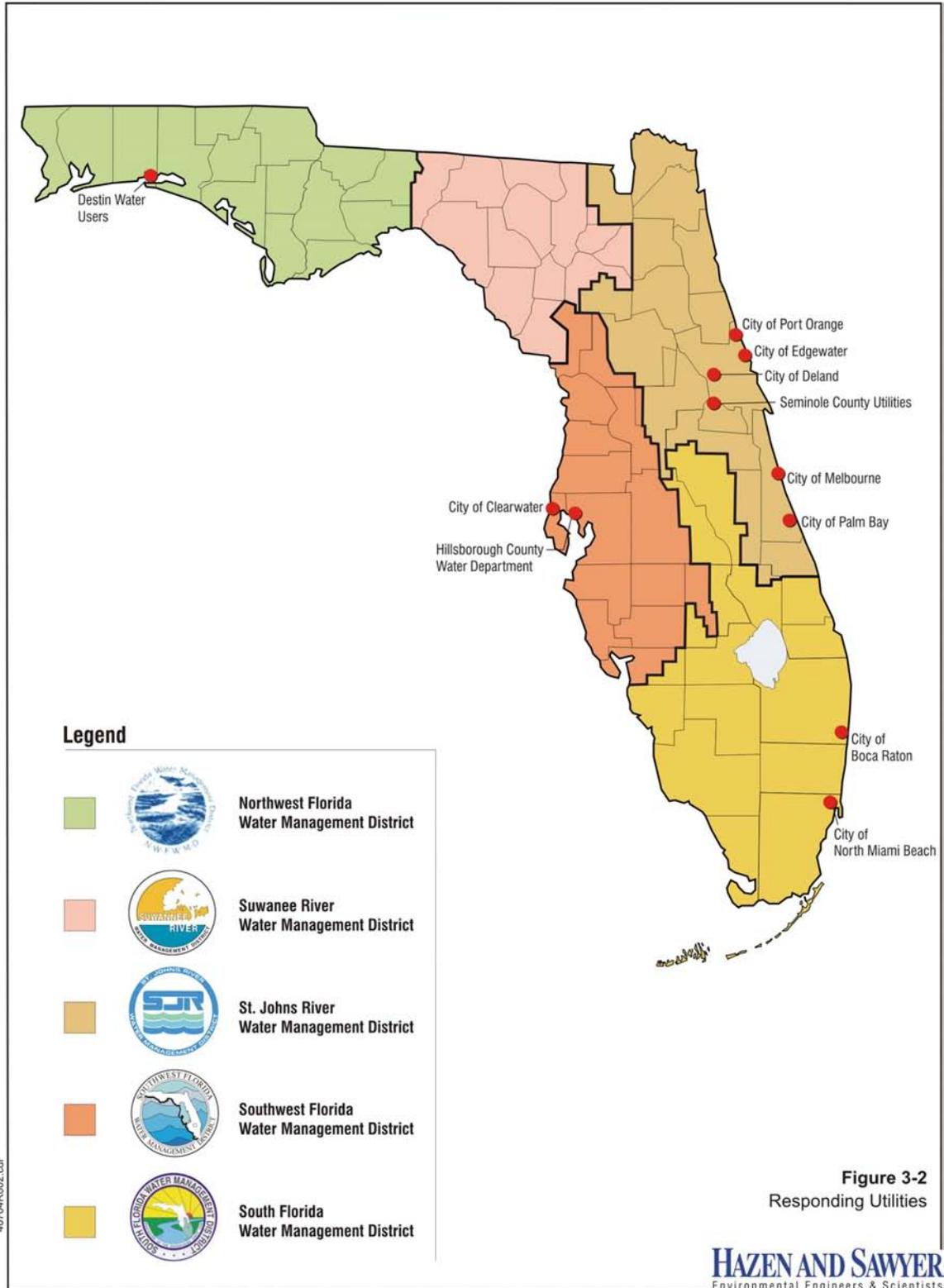
- E. Per Capita - Respondents were asked questions regarding the use of gallons per capita as a performance measure and how it is calculated; and
- F. Miscellaneous Questions - Respondents were asked general questions regarding performance measures that they felt were best for evaluating the effectiveness of a conservation program when the goal was volume-based and when the goal was cost-based.

### **3.3 Delivering the Survey Tools and Receiving Responses**

All five WMDs responded to the survey. This provided an understanding of their water conservation requirements through rules, standard and special permit conditions and as a requirement for conservation grants. A compilation of survey responses from the WMDs is presented in Appendix C.

A total of 41 public water supply utilities were polled (Figure 3-1). Eleven utilities responded (Figure 3-2) with sufficient detail to catalogue various performance measures and indicators in use. A compilation of utility survey responses is presented in Appendix D.





## **Section 4.0**

# **Water Management District Survey Results**

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### **4.1 Water Conservation Plans Required by Rule or as a Permit Condition for Public Water Suppliers**

#### **4.1.1 Southwest Florida Water Management District**

- By rule, water conservation plans, which are distinct from the Conservation Plans addressed in 373.227, F.S., are required as a special permit condition and applies to all public water supply (PWS) utilities with an annual average permitted quantity of 500,000 gallons per day (gpd) or more.
- In a Water Use Caution Area (WUCA), water conservation plans are also required by rule and included as a general permit condition for utilities with an annual permitted quantity of 100,000 gpd or more.
- The plan is required to be submitted during the permit application/renewal process, with progress reports typically being due midway through the permit life and six months before permit expiration.
- In a WUCA, specific water conservation plans are required for all significant uses that a utility voluntarily deducts from their per capita water use calculation (significant uses and per capita calculations are further described in Section 4.4). These customer-specific plans are submitted as part of an annual reporting requirement.
- A utility not subject to the requirements discussed above may be required to submit a water conservation plan on a case-by-case basis in response to a permit-specific concern or a compliance issue.
- The plans are compiled and the information submitted by utilities is included in the District's Regional Water Supply Plan and other reports. Reports are catalogued online at the District's website.
- Elements of the water conservation plan include:
  - A. Water conservation measures that meet water-conserving rule criteria and are appropriate to the utility and designed to enhance or supplement water savings;
  - B. Reuse to be incorporated to the greatest extent practical;

- C. In a WUCA, a system water audit is required within two years of permit issuance and any time that the PWS' annual report indicates unaccounted-for use in excess of 12% of total annual average system use;
- D. In WUCAs, existing PWS utilities are required to have adopted a water-conserving rate structure by January 1, 2004. New PWS utilities must adopt a water-conserving rate structure within two years of permit issuance and submit a report estimating its effectiveness within one year following adoption.
- F. Within the Southern Water Use Caution Area, rate structure information must be provided to each customer at least once during each calendar year. The information must describe applicable fixed and variable charge rates, minimum quantity charges, block size and pricing, seasonal rates and applicable months.
- G. Within the Southern Water Use Caution Area, an annual report on residential water use by type of dwelling unit is required.

#### **4.1.2 South Florida Water Management District**

- All public water supply utilities that receive an allocation greater than 15 million gallons per month (approximately 500,000 gpd) are required by rule to submit a water conservation plan. The plan is required to be submitted during the permit application/renewal process. For a utility with an annual allocation greater than 10 million gallons per day (MGD), and a permit duration of 20 years, an update is required every five years from the date of permit issuance.
- Water conservation plans are not compiled or evaluated for effectiveness.
- SFWMD mandates the following specific elements as part of the conservation plan:
  - A. The limitation of all lawn and ornamental irrigation to the hours, at a minimum, of 4:00 P.M. to 10:00 A.M. The permit applicant or enacting local government may adopt an ordinance which includes exemptions from the irrigation hour restrictions for the following circumstances, irrigation systems and/or users:
    1. Irrigation using a micro-irrigation system;
    2. Reclaimed water end users;
    3. Preparation for or irrigation of new landscape;

4. Watering in of chemicals, including insecticides, pesticides, fertilizers, fungicides, and herbicides when required by law, recommended by the manufacturer, or constituting best management practices;
  5. Maintenance and repair of irrigation systems;
  6. Irrigation using low-volume hand watering, including watering by one hose attended by one person, fitted with a self-canceling or automatic shutoff nozzle or both; or
  7. Users irrigating with 75% or more water recovered or derived from an aquifer storage and recovery system.
- B. Where the local government operating the public water supply utility determines that Xeriscape would be of significant benefit as a water conservation measure relative to the cost of Xeriscape implementation, the local government is required to adopt a Xeriscape landscape ordinance.
- C. The adoption of an ordinance requiring the installation of ultra-low volume plumbing fixtures in all new construction.
- D. The adoption of water conservation-based rate structures. Such rate structures should include at least one of the following alternative components: increasing block rates, seasonal rates, quantity-based surcharges and/or time-of-day pricing as a means of reducing demands.
- E. The implementation of leak detection programs by utilities with unaccounted-for water losses of greater than 10% is required. Such leak detection program must include water auditing procedures, in-field leak detection efforts and leak repair. The program description should include the number of person-hours devoted to leak detection, the type of leak-detection equipment being used and an accounting of the water saved through leak detection and repair. It is the policy of the District to encourage public water supply systems to have no more than 10% unaccounted-for water losses.
- F. For local government applicants, the adoption of an ordinance requiring any person who purchases and installs an automatic lawn sprinkler system to install, operate and maintain a rain sensor device or automatic switch which will override the irrigation cycle of the sprinkler system when adequate rainfall has occurred pursuant to Section 373.62, F.S.
- G. The implementation of water conservation public education programs.

- H. For those potable public water supply utilities that control, either directly or indirectly, a wastewater treatment plant, an analysis of the economic, environmental and technical feasibility of making reclaimed water available. Use of the Guidelines for Preparation of Reuse Feasibility Studies published by the FDEP in November, 1991 is suggested.
- I. Procedures and time frames for implementation shall be included in the Conservation Plan.

#### **4.1.3 St. Johns River Water Management District**

- All public water supply permittees are required to submit a water conservation plan by rule. The entire District has been designated as a Water Resource Cautionary Area (WRCA); therefore, all PWS utilities in SJRWMD are required to submit a plan.
- The water conservation plan is reviewed and accepted or modified at the time of permit application.
- All water conservation plan elements listed below are required unless the applicant provides documentation demonstrating that implementation is not economically, environmentally or technologically feasible. The survey response indicated that although “cost beneficial” does not equate to “economically feasible,” the cost of implementation and the anticipated results are considered by the reviewer. However, there is not a specific ratio or defined threshold for consideration of feasibility.
- Elements of the water conservation plan include:
  - A. A water audit;
  - B. Meter survey;
  - C. Leak detection evaluation is required when the water audit indicates 10% unaccounted-for water use;
  - D. Meter replacement program when meters are less than 95% accurate, 15 years old, or are beyond their useful life based on cumulative gallons measured;

- E. A customer and employee water conservation education program, which includes all of the elements listed below:
1. Televisе water conservation public service announcements;
  2. Provide water conservation videos to local schools and community organizations;
  3. Construct, maintain, and publicize water-efficient landscape demonstration projects;
  4. Provide water conservation exhibits in public places such as trade shows, festivals, shopping malls, utility offices, and government buildings;
  5. Provide/sponsor water conservation speakers to local schools and community organizations;
  6. Provide water conservation articles and/or reports to local news media;
  7. Display water conservation posters and distribute literature;
  8. Provide landscape irrigation audits and irrigation system operating instructions to local small businesses and residents; and
  9. Establish a water audit customer assistance program, which addresses both indoor and outdoor water use.
- F. Submit a written proposal and implement a water conservation promoting rate structure, unless the applicant demonstrates that the cost of implementing such a rate structure is not justified because it will have little or no effect on reducing water use;
- G. When a permittee operates a reclaimed water system and requests a back-up water source to meet peak demands for reclaimed water, the applicant must submit a management plan designed to minimize the need for augmentation; and
- H. When an audit and/or other available information indicates that there is a need for additional water conservation measures in order to reduce a project's water use to a level consistent with projects of similar type, or when an audit and/or other information indicates that additional significant water conservation savings

can be achieved by implementing additional measures, other specific measures will be required by the District to the extent feasible, as a condition of the permit.

#### 4.1.4 Northwest Florida Water Management District

- Most large public supply utilities are required to submit water conservation plans as a specific condition on the CUP on a case-specific basis. All utilities located in a WRCA are required to submit a Plan.
- The Plan must include:
  - A. Xeriscape and rain/moisture sensor cutoff device on automatic irrigation systems as required by Florida Statutes;
  - B. Analysis of the economic, environmental and technical feasibility of providing reclaimed water for reuse within five years and of providing total reuse of reclaimed water within 20 years;
  - C. Conservation measures intended to reduce per capita water use to 110 gpcd; examples of such measures include but are not limited to:
    - 1. Adoption of water conservation-based rate structure;
    - 2. Reduction of leaks to 10% or less of the water withdrawn; and
    - 3. Implementation of water conservation public education programs.
- Plans are updated and reviewed every five years or at permit modification/renewal.
- District considers what is cost beneficial to the utility when reviewing the water conservation plan.
- Where water-use efficiency is demonstrated, the District allows for longer permit durations.

### **4.1.5 Suwannee River Water Management District**

- Although water conservation plans are currently not required by rule, SRWMD is undergoing rule revisions and are considering requiring water conservation plans by all PWS permittees as a permit condition.

## **4.2 WMD Conservation Goals and Evaluation of Public Water Supply Water Conservation Plans**

### **4.2.1 Southwest Florida Water Management District**

- Within the WUCAs, public supply per capita water use should not exceed 150 gpd/capita (gpcd) by rule. When a permittee is below this requirement the per capita is tailored to the permittee's utility characteristics and circumstances. Often within a WUCA, additional goals are proposed by the permittee to ensure that the per capita goal is met and/or to further conservation. The goals are often based on performance indicators such as the development of a toilet rebate program, or to replace a certain number of inefficient toilets.
- The District requires a per capita water use of 132 gpcd if construction in the service area began after 1983, reflecting savings intended by the Unified Building Code, Section 553.73, Florida Statutes.
- The time line to reach the applicable per capita water use goal is proposed by the utility and approved or modified by the District.
- Water conservation plans are evaluated for effectiveness through the utility's per capita water use.
- Outside WUCAs, there is a goal of 150 gallons per capita, and any permitting above that goal must address reduction of the rate in a conservation plan. Additionally, as described in Section 4.1.1 there may be a permit condition that requires that certain conservation best management practices (BMPs) be implemented.

### **4.2.2 South Florida Water Management District**

- No water conservation goals are specified by rule or in water conservation plans beyond implementing specific BMPs such as ordinances and/or a leak detection program (if unaccounted-for water is more than 10%).
- Water conservation plans are not evaluated for effectiveness.

### 4.2.3 St. Johns River Water Management District

- Some permits incorporate anticipated demand reductions into the allocation, but this is on a case-specific basis and is normally not related directly to a water conservation goal.
- The District evaluates a utility's conservation performance by the overall consumption.
- Certain elements of the water conservation plan may be required to be implemented by permit condition on a case-specific basis within a specified time frame
- Generally, specific performance measures are not used in developed plans.
- The District considers overall water-use efficiency in determining permit duration.

### 4.2.4 Northwest Florida Water Management District

- Although not required to be specified in a water conservation plan, the overall goal of the District is 110 gpcd and less than 10% water loss. The per capita goal applies by rule in Santa Rosa, Okaloosa, and Walton Counties because they have been identified as WRCAs.
- Timeframes for meeting per capita water use goals vary according to resource concerns or limitations in the area of the withdrawals.
- The District evaluates utility water-use efficiency by evaluating per capita demand, system losses and the maximum daily withdrawals divided by the average daily withdrawals.
- Water conservation plans are not evaluated quantitatively. Utilities are not required to identify the amount of water that will be conserved, although some offer it in the form of water savings per capita. Evaluation of plans is a general check to determine if the utility is taking steps to conserve water.

### **4.2.5 Suwannee River Water Management District**

- SRWMD rules currently do not include water conservation goals and plans are not required at this time.

## **4.3 Conservation Reporting in Order to Receive Funding**

### **4.3.1 Southwest Florida Water Management District**

Depending on the type of conservation BMP that the applicant is requesting funding for, the utility might give results or estimated savings from similar programs. When funding is provided, the District requires the utility to report outcome or outputs from the program. The performance measure required to be reported by the utility and used by the District to evaluate the program's effectiveness varies by program but is typically gallons saved per measure (e.g., gallons saved per toilet retrofitted) or savings per participating account.

### **4.3.2 South Florida Water Management District**

This district does not require utilities to include results or estimated savings when applying for funding. The District noted in their survey response that consistency with Regional Water Supply Plan recommendations was a criterion considered for grant funding. When funding is granted, the utility is required to report the gallons saved per year as a result of implementing the BMP.

### **4.3.3 St. Johns River Water Management District**

For Conservation Cost Share grant applications, results of similar programs need not be specifically documented only addressed as it relates to the need and benefits for the project funding that is being requested, but further support may be requested by the District to substantiate the funding request. Many projects already have a widespread understanding of the benefit, such as toilet retrofits or cannot be quantified, such as conservation awareness campaigns. In cases where the anticipated outcome of the project for which funding is being requested can be calculated, it is usually expressed in gpd or gpcd. Once programs are funded, the District does not require utilities to report the success or outcomes of programs. The District evaluates the success of programs by simply verifying that programs were fully implemented.

### **4.3.4 Northwest Florida and Suwannee River Water Management Districts**

Northwest Florida and Suwannee River Water Management Districts do not currently fund conservation programs implemented by their permittees.

#### 4.4 Per Capita Water Use Calculations, Goals and Reporting

Per capita water use is typically a measurement of water consumption related to a specific population. In general, per capita water use refers to the gallons of water withdrawn or used divided by the utility's population using the water and is expressed as gallons per capita day (gpcd). Each WMD uses per capita for permitting and forecasting supply needs; however, per capita calculations and their associated population estimates vary among WMDs as presented in the following sections.

##### 4.4.1 Southwest Florida Water Management District

SWFWMD uses two per capita calculations: one is adjusted gross per capita and the other is compliance per capita. Compliance per capita is the same as adjusted gross per capita with the exception of allowing for desalination and reuse credits as described below. Generally, the District uses 150 gpcd to forecast a utility's water demand. If a utility has a history of a per capita less than 150 gpcd or if they are in an area where they are not restricted to 150 gpcd, their historical per capita is used to determine future demand based on population projections. However, if the utility is outside of a WUCA and their calculated per capita exceeds 150 gpcd, the District will consider their allocation request but will set interim goals for them to achieve, and require additional conservation measures to reduce their per capita water use.

##### Adjusted Gross Per Capita in SWUCA

Adjusted gross per capita =  $(WD + IM - EX - TL - SU - EM) / FP$ .

where: WD = total withdrawals of ground and surface water;

IM = water imported or bought from another supplier;

EX = water exported or sold to other suppliers;

TL = treatment losses;

SU = significant uses;

EM = water used for environmental mitigation; and

FP = functional population.

Deduction of significant uses is only applicable in a WUCA, and at this time, it is generally optional for a permittee to report significant uses in their annual report. A significant use is an individual, non-residential customer using 25,000 gallons per day or greater on an average annual basis, an individual, non-residential customer using an amount rep-

representing 5% or more of the utility's annual use, or in the Southern Water Use Caution Area, the sum of multiple small, similar non-residential uses that is greater than the District average. Each non-residential use deducted as a significant use has to be identified and a water conservation plan is required for it. Golf courses do not qualify as a significant use; they are typically served via reclaimed water (except for clubhouse use) or are governed by a separate Water Use Permit.

Deductions for environmental mitigation are optional and are only allowed if the mitigation is required as a District permit condition. Environmental mitigation only applies to a small number of regional wellfield permits.

Functional population is a monthly average population. It must include permanent population and may also include seasonal resident, tourist, and commuter populations. Seasonal residents and tourists are included only for the months in which they reside in the service area. Commuter population is the net value of persons coming into or exiting the service area for work. Documentation is required for all components of a functional population. Generally, population data sources that are acceptable include University of Florida Bureau of Economics and Business Research (BEBR), U.S. Geological Services (USGS), Regional, District, County or Municipal Planning Councils or Metropolitan Planning Organizations (MPOs). SWFWMD has developed a standardized method for calculating functional population in the SWUCA, scheduled to be approved by the Governing Board in 2005.

### **Compliance Per Capita**

Compliance per capita takes into account whether the utility proactively saves groundwater from use by giving a credit (deduction) for using a source that requires desalination technology to make it potable, or provides reuse water to a user that independently uses groundwater so that groundwater withdrawals are reduced. This credit process can only be used in the Eastern Tampa Bay, Highlands Ridge, and Northern Tampa Bay Water Use Caution Areas (the Eastern Tampa Bay and Highlands Ridge Water Use Caution Areas are part of the Southern Water Use Caution Area, which also includes the land between these two original areas).

Compliance per capita water use =  $(WD + IM - EX - TL - SU - EM - (RC + DC)) / FP$ .

where: RC = reuse credit; and

DC = desalination credit.

Utilities that provide reuse water to their own customers and replace existing potable use reduce their per capita water use "up front" by reducing their withdrawals. The reuse credit reduces the per capita water use "at the back end" by allowing the permittee to

subtract the amount of eligible reuse water from their actual annual pumpage. This credit levels the playing field for those utilities that provide reuse water to customers who were not originally served. The credit is limited to deducting quantities that would normally be permitted for the activity (e.g., if reuse is supplied for golf course irrigation, the acreage of greens, tees, and fairways must be submitted, and only the quantity of potable water that would be permitted for that use can be deducted, not a larger disposal quantity).

The desalination credit allows a permittee to deduct 50% of the finished water from desalination sources. A desalination source is a plant that removes or reduces salts and other chemicals from highly mineralized water of greater than 500 milligrams per liter total dissolved solids.

### **Per Capita Water Use Goals**

The three original Water Use Caution Areas, East Tampa Bay WUCA (ETBWUCA), Northern Tampa Bay WUCA (NTBWUCA), and Highlands Ridge WUCA (HRWUCA) currently have maximum allowable per capita water use (adjusted gross or compliance, as applicable) of 150 gpcd. The portion of the SWUCA that was not previously in a WUCA has 150 gpcd as a goal, just as in the remainder of the District. Even though 150 gpcd is a goal, utilities that have a per capita water use greater than this work with the District through conservation measures and cooperative projects to reduce their withdrawals.

The District limits residential per capita water use to 132 gpcd if construction in the service area began after 1983. This threshold reflects the water savings intended by the Unified Building Code, Section 553.73 Florida Statutes. If an applicant proposes a per capita water use rate higher than this, it must be supported with detailed information explaining the high rate and the applicant may be required to develop and implement a per capita water use reduction effort.

### **Reporting/Updating Per Capita Water Use**

Public Supply permittees in a Water Use Caution Area that have an annual average permitted quantity of 100,000 gpd are required to report per capita water use and the data used to generate this calculation on an yearly basis. Outside the WUCAs, reporting on a per capita requirement, if any, is on a case-by-case basis.

#### **4.4.2 South Florida Water Management District**

SFWMD uses per capita daily water use and maximum monthly peaking ratio to develop the recommended maximum monthly allocation. Please refer to Appendix C for more information on the maximum monthly peaking ratio.

### **Per Capita Daily Water Use**

Per capita daily water use is a guideline used to measure the reasonable withdrawal requests of public water supply applicants for an individual or general permit. Per capita water use includes population-related withdrawals associated with residential, business, institutional, industrial, miscellaneous metered and unaccounted uses. The average per capita daily use rate is calculated for the last five years or period of record, whichever is less, by dividing the average daily water withdrawals for each year of record by the permanent or seasonally adjusted population served by the utility for the same period of time. The per capita use rate that is most representative of the anticipated demands, considering the required water conservation plans, is identified and used for water demand projection purposes. The historical demand patterns may not always be appropriate for projection purposes. This may occur when there are current large users whose growth is not related to population, or when future development may take on characteristics very different than those of present development.

In service areas without significant seasonal population fluctuations, the use of permanent population estimates is appropriate. In service areas where there are significant seasonal population changes, the utility is required to estimate the seasonal population for use in conjunction with permanent population in the calculation of per capita daily water demand. Permanent and seasonal (if applicable) population growth must be projected for the requested duration of the permit, on a yearly basis, for the area served by the application. When population estimates are required for years in between published or referenced estimates, the utility must interpolate the data by assuming that population increases in equal increments in the years between established estimates.

Population data should be derived from the prevailing Comprehensive Land Use Plan (developed under Chapter 9J-5, F.A.C.). If the utility's population estimate varies from the Comprehensive Plan, other accepted sources of population data to validate the variance include the following: (1) University of Florida Bureau of Economics and Business Research (BEBR); (2) Regional Planning Council (RPC); (3) County Planning Departments; or the (4) District Planning Department.

### **Per Capita Water Use Goals**

Specific per capita water use goals are not indicated in the rules or otherwise.

### **Reporting/Updating Per Capita Water Use**

An update of the per capita daily water use is required every five years from the date of permit issuance for public water supply permits with an annual allocation greater than 10 MGD and permit duration of 20 years.

### **4.4.3 St. Johns River Water Management District**

Per capita water use values differ among permittees based on the characteristics of their service area. Some utilities provide their monthly usage and the District calculates per capita from their own population estimates, whereas some utilities report per capita. Generally, per capita use is calculated by dividing average day withdrawals (from Monthly Operating Reports) by the permanent population for the same period of time. The average daily withdrawals also can include commercial and industrial uses, so per capita varies widely. Where the information is available, attempts are made to separate commercial and industrial demands, or large irrigation demands, but the per capita water use number is generally used to evaluate historic use with projections of future demands.

#### **Per Capita Water Use Goals**

Public supply allocations are closely related to projected population and per capita use, but the per capita value is permit-specific and based on the characteristics of the service area. According to the District, it is not applied as a conservation goal.

#### **Reporting/Updating Per Capita Water Use**

Utilities report per capita use at the time of permit application (renewal or modification).

### **4.4.4 Northwest Florida Water Management District**

NFWFMD uses gross per capita water use which is calculated as total withdrawals divided by total population served. Permittees report use and equivalent residential connections (ERC). One ERC is equal to one single-family connection. ERCs are calculated for the multi-family and non-residential sectors based on water use. District staff calculate the utility's population by multiplying the ERCs by the service area's people per household (pph). The ERC-based population is typically compared to BEBR and USGS data and adjusted if needed. Then, per capita use is calculated by dividing the reported consumptive use by the calculated population.

#### **Per Capita Water Use Goals**

The overall goal of the District is 110 gpcd. This goal applies by rule in Santa Rosa, Okaloosa, and Walton Counties, which have been identified as WRCAs.

#### **Reporting/Updating Per Capita Water Use**

Per capita water use is updated during WUP renewal/modification.

#### **4.4.5 Suwannee River Water Management District**

SRWMD also uses gross per capita water use which is calculated as gallons used (from Monthly Operating Reports) by service area population. Population is calculated by multiplying the number of connections by the pph (most of the District consists of single-family accounts). The District does not have a per capita goal. Information regarding per capita water use reporting/updating was not provided in the survey response.

## Section 5.0

# Public Water Supply Survey Results

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### 5.1 Public Water Supply Utilities in Southwest Florida Water Management District

Information provided by responding utilities, City of Clearwater and Hillsborough County Water Department, generally reflect what was indicated by SWFWMD with respect to conservation reporting and goals. Performance measures required in the conservation plan by the District include overall reduction in per capita water use and unaccounted water loss of less than 12%. Both utilities report gross adjusted per capita water use to the District yearly (both utilities are in WUCAs). Each compare cost effectiveness of BMPs when considering which BMPs to implement and indicated the District focuses primarily on per capita water use compliance, and projects are generally required only if feasible and cost-effective. Hillsborough County has a utility-set goal of 100 gpcd and indicated that per capita water use is a good measure of water-use efficiency. City of Clearwater prefers monthly water demands as a measure of efficiency.

### 5.2 Public Water Supply Utilities in South Florida Water Management District

Information provided by responding utilities, Cities of North Miami Beach and Boca Raton, generally reflect what was indicated by SFWMD with respect to conservation reporting and goals. From the respondent's perspective, it appears that the WMD does not consider what is cost-effective to the utility; rather programs are implemented because they are required.

Performance measures used by Boca Raton include system-wide per capita water use (for measuring the effectiveness of their irrigation ordinance, reclaimed water program and water conserving rate structure). The number of ordinance violations is a performance indicator used to evaluate the effectiveness of their low-flow plumbing fixture ordinance. The respondent noted that per capita water use was not a useful metric for water-use efficiency for their service area because it does not account for total aquifer withdrawals and does not take into consideration the water needs of non-residential customers.

The City of North Miami Beach is evaluating the effects of pressure sustaining valves on decreasing peak demands. Although the City does not have a per capita water use goal, they calculate gross per capita (sales divided by population served) annually. The respondent for the City recommended cost effectiveness as the primary performance measure with potential water savings and public acceptance also being considered. The City further recommended that the districts should help with cost-benefit analyses and notes that SFWMD has a basic online model.

### 5.3 Public Water Supply Utilities in St. Johns River Water Management District

Responding utilities in the SJRWMD included cities of DeLand, Edgewater, Port Orange, Melbourne and Palm Bay and Seminole County. Although SJRWMD rules indicate that the District is flexible with conservation requirements, four of the six respondents indicated that the District does not consider what is cost effective to the utility; rather the focus is on per capita water use. The remaining two utilities did not answer the question.

There was consistency in the results from the three Water Alliance of Volusia (WAV) member utilities, which include Cities of DeLand, Edgewater and Port Orange. The universal goal with these three utilities is to lower per capita water use which is a goal set by the utilities and WAV. Cities of DeLand and Port Orange reported that the utility and WAV set a per capita water use goal of 100 gpcd. These utilities indicated that a water conservation plan is not required but documentation of CUP-specific conservation requirements is required. Performance measures reported by these utilities for cooperative funding included cost per thousand gallons saved and gallons saved per measure. Savings are measured at the account level using billing data. Cities of Edgewater and Port Orange noted a performance measure of years deferment of a water treatment plant (WTP). For these three utilities, general water use reduction is a measure used to evaluate the effectiveness of irrigation BMPs, including ordinances and watering restrictions. A performance indicator used by the utilities is public response, which is measured through customer surveys. The number of ordinance violations is a performance indicator used by the WAV utilities to evaluate the effectiveness of irrigation restrictions. These three utilities indicated that they must submit a Compliance Report every five years for their 20-year permit.

Seminole County reported that a water conservation plan is required by rule and that they have a specific CUP condition to reduce residential per capita water use by 2007, although the specific per capita water use goal was not provided. There is a consumption reduction goal set by the District: the County's allocation for their Northwest Service Area (NWSA) will be reduced from 1.69 to 1.37 mgd in 2013 (NWSA is under Consent Order). Savings from quantifiable BMPs are tracked using customer billing data and reported in gallons per day or per capita day or gallons per measure. The utility noted that gpcd is a good measure of water-use efficiency and that they have never assessed cost-effectiveness. Qualitative measures of interest included ease of implementation and public response. The utility noted that they would prefer the WMD to provide them with an allocation and let the utility choose how it will manage demand.

City of Melbourne reported that a water conservation plan is required as a CUP condition and that the plan must be updated every five years. Savings from BMPs are estimated rather than measured from utility billing data. Most of their conservation efforts are educational programs. Qualitative measures of interest included ease of implementation and public response.

City of Palm Bay Utilities reported that a water conservation plan is not required. Other than tracking the number of showerheads provided, the utility does not track savings as most programs are educational. They reported that they do not calculate or track per capita water use. A performance indicator used for educational programs is the number of attendees and feedback from attendees via a survey is also used.

#### **5.4 Public Water Supply Utilities in Northwest Florida Water Management District**

Destin Water Users (DWU) was the only utility in the NFWWMD that responded to the survey. They reported that they are required by permit conditions to prepare a water conservation plan that is consistent with the NFWWMD survey as DWU is located in a WRCA. They update their plan yearly for their 20-year permit. The overall goal of the WMD was stated to be reduction of groundwater use. The utility reported that they do not have a per capita water use goal by rule, but actually the goal is 110 gpcd. They are likely unaware of the goal because they are well below 110 gpcd due to their reclaimed water utilization rate of 100%.

## Section 6.0

### Survey Conclusions

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In order to ensure PWS water-use efficiency, WMDs require utilities to implement water conservation measures (or BMPs). Some requirements are taken directly from existing WMD rules, while others are more permit-specific but based on existing rules. In many cases, WMDs require utilities to submit water conservation plans. The plan is the process whereby a utility and WMD document conservation practices that are the basis of the permitted allocation and/or agree upon conservation measures to supplement or enhance water savings by the utility. Across the state, large PWS utilities are required to submit a water conservation plan; these utilities include systems permitted for 500,000 gpd in SWFWMD and SFWMD but are not defined by NFWWMD, which requires the plan on a case-specific basis. The plan is also required for utilities permitted for 100,000 gpd if they are located in a SWFWMD WUCA. All utilities, regardless of size, are required to submit a plan if located in a WRCA in SJRWMD or NFWWMD (the entire SJRWMD is a WRCA). In all districts, a utility may be required to submit a plan for other reasons such as compliance issues.

Elements of the conservation plan vary among the four WMDs that currently require it. SFWMD and SJRWMD have a menu-based approach whereby utilities are required to implement a relatively long list of specific conservation measures. Furthermore, SJRWMD may require additional conservation measures if warranted by available information. Flexibility in the conservation requirements exists by rule in SJRWMD, but SFWMD does not have similar flexibility.

NFWWMD and SWFWMD require utilities to implement a short menu of specific water conservation plan elements. In SWFWMD, the elements include rate structures, reuse, and water audits (when system losses are in excess of 12%). In NFWWMD, the elements include reuse, a reclaimed water feasibility analysis, water audits (when system losses are in excess of 10%), and ordinances for Xeriscape and rain/moisture sensor cutoff devices on automatic irrigation systems. Other measures or BMPs are required by these two WMDs, but the utility may choose which BMPs to implement.

## Section 7.0

# Recommended Performance Measures

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It is recommended that a complete performance measurement system for a water conservation program consist of both goal-based performance measures and task-based performance indicators. Goal-based or outcome-based performance measures correlate to water-use efficiency when appropriately applied; whereas, task-based indicators measure water conservation effort. Although Florida's Water Conservation Program is a goal-based program, it is important to include task-based indicators as part of the overall performance measurement system. They provide a means to evaluate effort and the effects of that effort on the achieving water conservation goals.

Measures and indicators presented in this section are recommended for incorporation into Florida's Water Conservation Performance Measurement System. These measures are presented as a list of options. They may be applied individually and/or as subsets of measures to be applied as an integrated suite. Sets of measures to be used as an integrated suite depend on the level and setting they are intended to be used in. BMP selection also affects which measures should be pulled into a set to be applied as an integrated suite.

Pilot applications of various elements of the Florida Program will be implemented through cooperative agreements with volunteer utilities. As data from pilot projects indicate effectiveness of the recommended measures, BMP-specific sets of measures to be applied as an integrated suite can be defined. In Section 7.1, recommended goal-based performance measures are discussed in detail. Examples of task-based performance indicators and qualitative measures are provided in Sections 7.2 and 7.3, respectively.

### 7.1 Recommended Goal-based Performance Measures

Goal-based or outcome-based performance measures provide a "yardstick" to quantitatively assess the results of implementing water conservation programs and practices. Goal-based measures recommended in this report are a comprehensive set of water conservation performance measures currently in use in Florida and/or measures that are widely-accepted (nationally) as appropriate water conservation performance measures. These measures are recommended because:

- They are relatively easy to understand;
- The necessary data is relatively easy to obtain, especially for utilities with computerized disaggregated billing data; and
- They focus directly on the two most important aspects of a good conservation program—volume of water saved and cost-effectiveness.

For any performance measurement system, the performance measures are best understood when showed relative to a framework. The most appropriate framework for Florida's Public Supply Water Conservation Performance Measurement System should show measures applied at various levels of disaggregation from the district level down to the utility level and its customer classes as shown in Figure 7-1. This framework is appropriate because water-use efficiency can be measured at the account level and then summed or averaged to the utility level. The conservation effects quantified at the account level is the best available data.

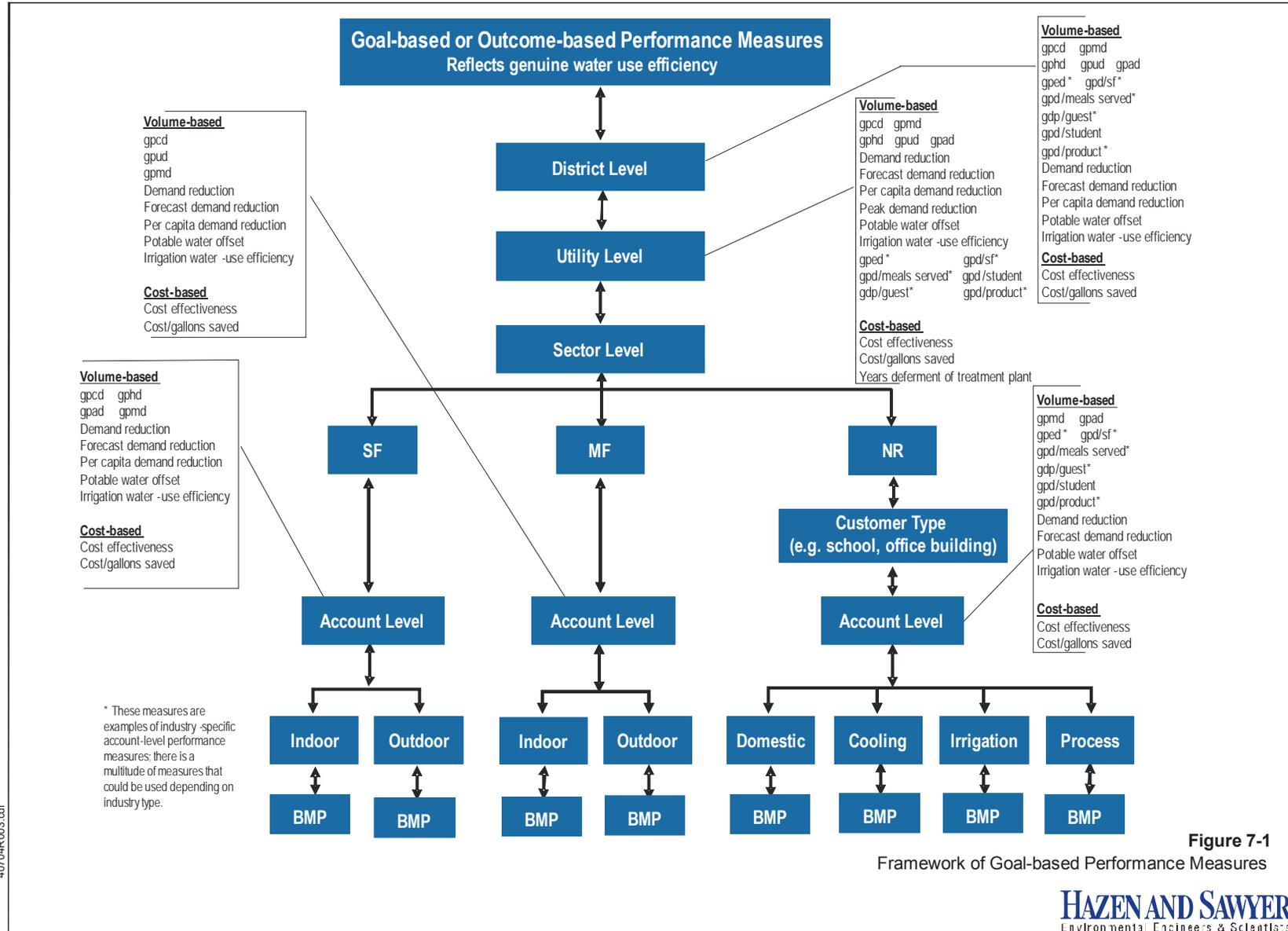


Figure 7-1  
Framework of Goal-based Performance Measures



There are trade-offs involved in using these measures. Some utilities do not have computerized billing data and many have difficulty collecting the necessary data for some of the measures. Also, tracking the performance of irrigation-influenced BMPs will require normalization for weather. Another trade-off of the goal-based program is that it will require the water management districts to devote more staff time to evaluating utility conservation programs and practice. Nonetheless, the recommended performance measures would provide an improved system, broadly applicable throughout the state, for quantifying water savings and cost-effectiveness achieved by goal-based public supply water conservation programs.

Goal-based performance measures can (and should) be used in more than one context, or “setting.” Table 7-1 is a matrix of the recommended performance measures and the settings in which the measures can inform decision-making. For each performance measure, the setting and level where the measure could be useful is indicated. The settings that are applicable to Florida’s Public Supply Water Conservation Performance Measurement System includes WMD Permitting and Compliance, Demand Forecasting, and Internal Effectiveness Assessment.

**Table 7-1  
Settings for Recommended Goal-based Performance Measures**

<b>Recommended Goal-based Performance Measures</b>	<b>WMD Permitting and Compliance</b>	<b>Demand Forecasting</b>	<b>Internal Effectiveness Assessment</b>
<b>Demand reduction</b>	D, U, SF, MF, NR	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Demand forecast reduction</b>	D, U, SF, MF, NR	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Peak demand reduction</b>	U	U	U
<b>Potable water offset</b>	D, U	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Irrigation water-use efficiency</b>	D, U, SF, MF, NR	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Per capita demand reduction</b>	D, U, SF, MF	D, U, SF, MF	D, U, SF, MF
<b>gpcd</b>	D, U, SF, MF	D, U, SF, MF	D, U, SF, MF
<b>gphd</b>	D, U	U, SF	U, SF
<b>gpud</b>	D, U	U, MF	U, MF
<b>gpap</b>	D, U	U, SF, MF, NR	U, SF, MF, NR
<b>gpmc</b>	D, U, SF, MF, NR	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>gpd/"x" where: x=student, guest, meal, etc.</b>	D, U	NR	NR
<b>Cost effectiveness</b>	D, U	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Cost/gallons saved</b>	D, U, SF, MF, NR	D, U, SF, MF, NR	D, U, SF, MF, NR
<b>Years deferment of WTP construction or expansion</b>		U	U

*D = District level; U = utility level; SF/MF/NR = single-family/multi-family/non-residential sectors*

*gpcd = gallons per capita day*

*gphd = gallons per household per day*

*gpud = gallons per unit per day*

*gpap = gallons per account per day (same as gphd in the SF sector)*

*gpmc = gallons per measure per day (an example of a measure is a rebated toilet)*

Just as the recommended measures have more than one setting in which they can be used, their associated goals may have a different numerical value at each "level." For example, in Table 7-1 the first measure is Demand Reduction. Under the column titled WMD Permitting and Compliance, it can be seen that a demand reduction as a perform-

ance measure can be used at different levels. Likewise, the demand reduction goals may be different at the various levels. For example, a WMD may have a district-wide demand reduction goal. A utility may have a utility-wide goal that simply reflects the district-wide goal or they may have their own, more aggressive goal. Furthermore, to achieve its overall goal, a utility might set different demand reduction goals for each of its water use sectors (single-family, multi-family and non-residential).

In the following sub-sections, each of the recommended performance measures are discussed in detail.

### **7.1.1 Demand Reduction and Demand Forecast Reduction**

Demand reduction is a performance measure used to determine the effect of previously-implemented BMPs on demand. Demand forecast reduction is the amount by which the demand forecast is reduced as a result of implementing water conservation measures; expressed as a percentage of the baseline forecast or in gallons per day. These two performance measures are applicable across all levels of disaggregation as shown in Figure 7-1, including indoor and outdoor water use.

WMD Permitting and Compliance Settings: SJRWMD incorporates anticipated demand reductions into the permitted allocation (on a case-specific basis) and uses overall consumption as a water conservation performance measure. Similarly, SFWMD is asking utilities to look at conservation as their future supply. In other words, the utility's growth is to be sustained by implementing conservation measures. Although currently not applied, a utility may propose a plan that includes sector-specific demand forecast reductions such as single-family or even outdoor water use.

Demand Forecast Setting: It is important for utilities and WMDs to include forecasted demand reduction in their demand forecasting models to determine how the BMPs will affect the forecast demand and identify the deferment of the need to develop additional sources. Utilities could further enhance their demand forecasts by forecasting demands at the sector level.

Internal Effectiveness Assessment: Comparing baseline demand forecasts against a forecast that includes the anticipated demand reduction due to conservation allows a district or utility see the effect water conservation has on the forecasted demand. It also allows a utility or district to evaluate and compare the effect that BMPs had on their previous demand such that they can select BMPs that result in the greatest reduction in their demand. This evaluation can also occur on a sector level to evaluate how a BMP affects the demand in the various sectors.

### 7.1.2 Peak Demand Reduction

Peak demand reduction measures the effect that conservation has on reducing a utility's peak demand. This is an important performance measure because lowering peak demands defers the need for water treatment plant expansions. Caution should be exercised when using peak demand as a water conservation performance measure. There are justified peaks in demand that are not associated with inefficient use of water. For example, irrigation demand will naturally peak during Florida's dry months regardless of the level of efficiency of the irrigation systems in the service area. Different types of peak demands are described below.

- **Peak hourly demand (PHD)** is the maximum hourly flow that occurs during the 24-hour period. This typically occurs during morning and afternoon periods when usage is its highest. It is a function of increased residential water use (such as bathing and toilet use), but is also dependent on irrigation. Irrigation affects the PHD because irrigation typically increases utility-wide during the first hour of allowable watering.
- **Peak day demand (PDD)** is the maximum flow for a 24-hour period during either a month or a year. It can be a function of an annual event hosted within a utility's service area.
- **Peak month demand (PMD)** is the maximum monthly demand for the 12-month period. It is typically a function of rainfall and seasonal populations.

WMD Permitting and Compliance Settings: Peak demand reduction is not recommended to be used in this setting.

Demand Forecast Setting: Peak demand reduction is a useful performance measure for utilities. Customer billing data can be used to evaluate peak month demand in a utility's service area. Peak hourly demand and peak day demand can be measured at the account level through implementation of an end-use study; otherwise PHD and PDD data is available on a utility-wide basis. It is the PHD and PDD that determines water treatment plant capacity requirements and is typically the parameter that drives treatment plant expansions and new source development. In selecting and evaluating BMPs, a utility should consider its peak demand reduction potential to help defer treatment plant expansions. An example of a BMP that effects peak demand is one that addresses irrigation.

Internal Effectiveness Assessment: Measuring the PDD, PMD and PHD across a service area before and after implementation of conservation BMPs will help a utility to assess the effect of a BMP on peak demand. Utilities should then choose BMPs that have a high peak demand reduction potential.

### 7.1.3 Potable Water Offset

Potable water offset is the amount of potable quality water saved through the use of reclaimed water expressed as a percentage of the total reclaimed water used. The potable water offset is calculated by dividing the amount of potable water saved by the amount of reclaimed water used and multiplying the quotient by 100 (Chapter 62-40.120(21), F.A.C. (proposed)).

The definition and calculation provided above are limited to the use of reclaimed water. However, potable water offset is used in practice to include the use of other alternative sources such as non-potable groundwater for irrigation and is sometimes expressed in gallons of potable water saved.

WMD Permitting and Compliance Settings: To implement this as a performance measure to be used in permitting and compliance settings may require rulemaking at one or more of the WMDs.

Demand Forecast Setting: The potable water offset could be used to adjust demand forecasts at the district, utility and sector levels to determine the effect of alternative irrigation sources on forecasted demands.

Internal Effectiveness Assessment: Measuring the potable water offset will allow a utility to identify how effective shallow groundwater or reclaimed water is at lowering potable demand.

### 7.1.4 Irrigation Water-use Efficiency

Irrigation water-use efficiency is the ratio of water beneficially used in plant growth to water applied, expressed as a percentage. Based on its technical definition, the only way to measure it is at the account level where irrigation water use and landscape information are available. Obtaining landscape and irrigation water use data at the account level is possible through irrigation audit programs such as the "Sensible Sprinkling" and the "Mobile Irrigation Lab" programs.

WMD Permitting and Compliance Settings: SFWMD requires utilities to establish watering restrictions with some exemptions, a Xeriscape ordinance (if found to be a significant benefit) and an ordinance requiring a rain sensor shut-off device. SFWMD currently requires reclaimed water to be incorporated to the greatest extent practical and efficient use of water for irrigation of significant uses (see Section 4.1.1) may be assumed in permitting allocations.

**Demand Forecast Setting:** Water-efficient landscape and irrigation BMPs, including ordinances can result in significant savings and should therefore be applied to forecasting models. However, a utility must diligently enforce landscape and irrigation ordinances if it expects to capture the intended water savings.

**Internal Effectiveness Assessment:** Irrigation water-use efficiency is an important performance measure since outside use accounts for more than half of water used by SF homes with in-ground irrigation systems. As previously mentioned, irrigation audit programs are the best way to implement this performance measure.

### **7.1.5 Per Capita Water Use and Per Capita Demand Reduction**

**WMD Permitting and Compliance Settings:** Per capita water use is currently used by SWFWMD and NFWMD in their Water Use (or Resource) Caution Areas. These performance measures are good for permitting because they are relatively simple to calculate and are broad-based. However, per capita water use as a performance measure becomes problematic when accounting for transient populations. To address this matter, SWFWMD currently provides for the calculation of permanent and seasonal populations in its rules, and recognizes calculations of commuter and tourist populations if the utility desires. In the SWUCA, SWFWMD has developed for adoption a population methodology that will apply to utilities permitted for 100,000 gpd or greater and provides data and processes to account for commuter and tourist populations, in addition to permanent and seasonal populations.

**Demand Forecast Setting:** Since demand forecasting is based on population estimates, it is appropriate to use this performance measure to forecast demand at the broad District-wide level. However, for reasons discussed above it is not recommended for forecasting at the utility level except for the residential sectors.

**Internal Effectiveness Assessment:** Per capita demand reduction can be a suitable measure for a utility to assess its water-use efficiency improvement across the service area. However, it is recommended to only use this performance measure for single-family and multi-family sectors as it is not relevant to the non-residential sector.

### **7.1.6 Gallons per Household per Day (gphd), Gallons per Unit per Day (gpud), and Gallons per Account per Day (gpud)**

All three of these terms are account-level performance measures that can be averaged across the utility service area or district. Gallons per household per day is for the single-family (SF) sector and gpud is for the multi-family (MF) sector. Gallons per account per day is applicable to all sectors (SF, MF and NR) and is synonymous with gphd when applied to the SF sector. Gallons per account per day and gphd are easy to obtain through utility billing data, which is the most accurate and easily obtainable water use data.

However, gpud cannot be measured directly by a utility. A MF customer may submeter units but the information is not passed on to the utility. The performance measure gpud can be estimated by dividing the account water use by the number of units where available. The SWFWMD currently requires its permittees to report the number of MF units served by the utility.

WMD Permitting and Compliance Settings: Gallons per account per day and per household per day are appropriate measures for permitting and compliance settings on a district-wide basis because most utilities have this information. However, for some utilities, MF customers are lumped in with their non-residential accounts and few utilities know the number of units for each MF customer. Therefore, it is not recommended that districts use gpud in a permitting and compliance setting on a district-wide basis. Instead, gpud should be used in a permitting/compliance setting when proposed by a utility to measure performance of a BMP to demonstrate goal attainment.

Demand Forecast Setting: These terms are generally the ones used in demand forecasting models that are widely used and accepted.

Internal Effectiveness Assessment: These terms are a useful measure for a utility to assess its water-use efficiency improvement across the service area.

### **7.1.7 Gallons per Measure per Day (gpmd)**

This performance measure is used to assess the effect of a specific water conservation measure.

WMD Permitting and Compliance Settings: This performance measure is not appropriate for permitting and compliance settings. It is not appropriate to require a specific savings rate per conservation measure applied.

Demand Forecast Setting: When a utility forecasts demand, the savings rates associated with the conservation measures in the approved water conservation plan should be applied to the forecast model. It is much easier to evaluate the gallons per measure per day when it is used in conjunction with gpad, gphd and/or gpud than when it is used with gpud as forecast models typically use gpad, gphd and/or gpud. Also, BMPs are implemented at the account level rather than on a per capita basis.

Internal Effectiveness Assessment: This is an excellent use of gpmd. It provides a basis of comparison for evaluating different potential BMPs and allows the utility to evaluate different BMP implementation options based on their savings rate (gpmd).

### **7.1.8 Gallons per Day per Employee, Meals Served, Guest, Student, Product, Square Foot**

These are examples of account-specific performance measures that are applicable to the non-residential (NR) sector only.

WMD Permitting and Compliance Settings: These performance measures are NR account-level measures and are too specific to be used for permitting and compliance on a district-wide basis. However, if a utility wishes to justify the demand for a specific component of its customer base or deduct a significant user (see section 4.4.1) from its per capita water use calculation (in SWFWMD), the utility and its district may find it helpful to use these measures in determining the quantity to be permitted, reporting actual use or developing a water conservation plan for that specific customer or customer classification.

Demand Forecast Setting: These measures could only be used to forecast demand at the account level unless all accounts had data and then it could be rolled up to the utility level.

Internal Effectiveness Assessment: This performance measure could be used by a utility to measure water use before and after customer implements a BMP. An example would be evaluating water use per student before and after a waterless or low-flow urinal replacement BMP was implemented at a school or a number of schools in the utility's service area.

### **7.1.9 Cost Effectiveness and Cost per Gallon Saved**

Cost effectiveness is the comparison of total costs relative to benefits. Costs are expressed in dollars, but benefits can be expressed in another unit (e.g., a quantity of water). Another common use of cost effectiveness is comparing the cost to save a unit of water to the cost to develop the next increment of water supply. As shown in Figure 7-1, cost-effectiveness could be evaluated at the WMD, utility and sector levels.

WMD Permitting and Compliance Settings: Generally, WMDs consider cost-effectiveness of various BMPs when reviewing the utility's water conservation plan. The new goal-based program will allow utilities the flexibility to propose only the more cost-effective BMPs.

Demand Forecast Setting: BMPs are evaluated based on their cost/gallons saved. Water conserved is a supply alternative that should be evaluated with other new or existing water source alternatives.

Internal Effectiveness Assessment: Cost effectiveness is the most common performance measure used by utilities to select among BMPs and evaluate post-implementation BMP success. Also, cost effectiveness of various conservation BMPs can be compared against supply alternatives based on their cost effectiveness.

#### **7.1.10 Years Deferment of Water Treatment Plant Construction/Expansion**

Years of deferment of a water treatment plant construction or expansion includes associated capital facilities such as withdrawal and storage facilities.

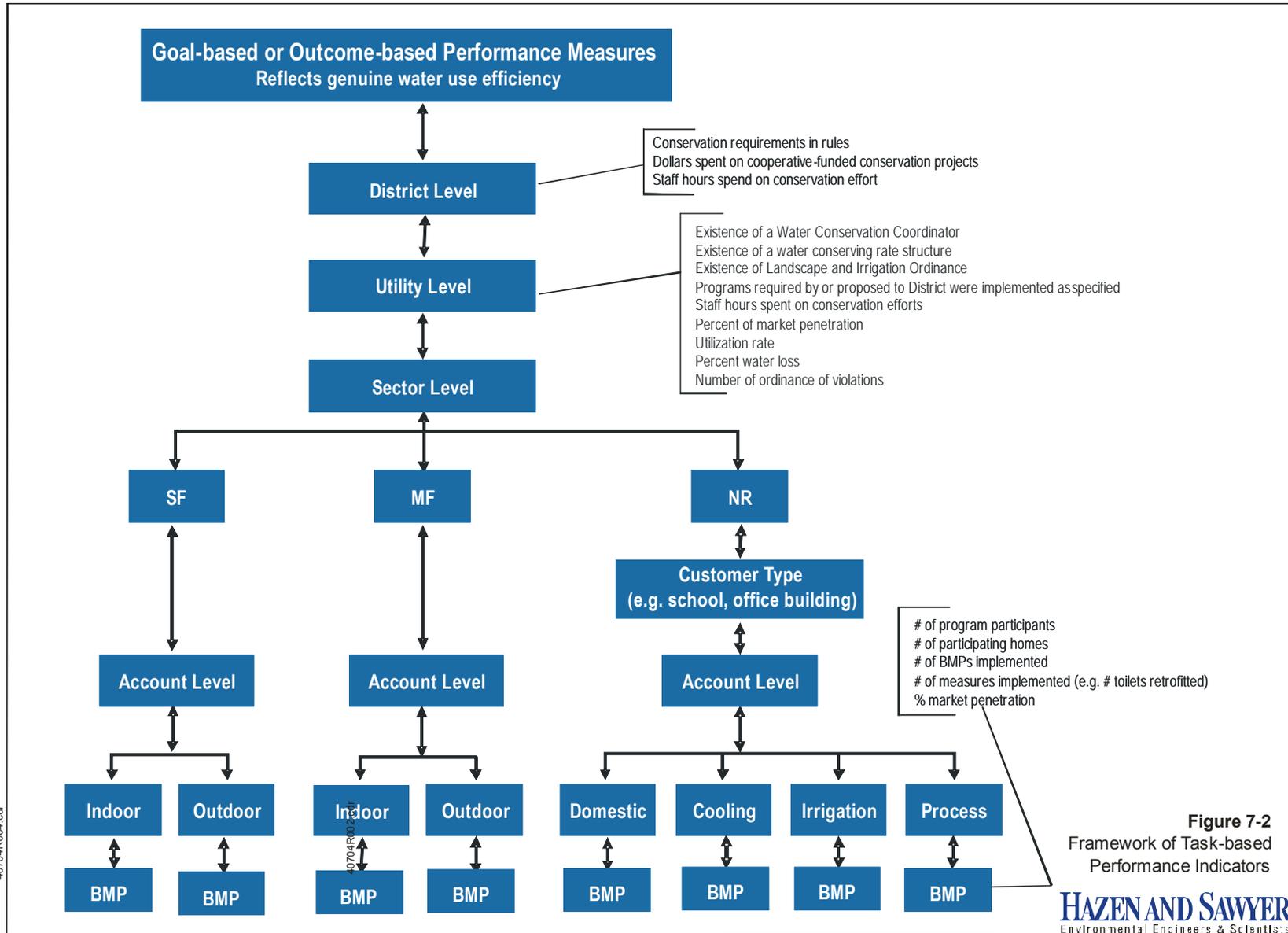
WMD Permitting and Compliance Settings: This performance measure has no relevance in a WMD water conservation permitting/compliance setting.

Demand Forecasting Setting: In a demand forecast setting, a utility determines at what point a new or expanded water treatment plant is needed. If demand management measures are applied and the forecast adjusted, the utility may find that the new or expanded plant can be deferred. The length of time that construction is deferred is indicative of the effectiveness of conservation measures implemented.

Internal Effectiveness Assessment: This performance measure provides for a good internal assessment to evaluate the benefits of demand management; it also works well in a public-relations setting as a means to justify money spent on conservation programs.

### **7.2 Task-based or Output-based Performance Indicators**

A performance indicator, as used in the context of this report, indicates water conservation effort. Water use efficiency cannot be directly evaluated from indicators. However, when used in conjunction with goal-based measures, the effect of the effort on achieving water conservation goals can be evaluated. They can also be used to demonstrate effort when goals have not been met or when the conservation measure being evaluated is difficult to quantify (e.g., education). Figure 7-2 shows numerous performance indicators relative to the same framework used for the goal-based measures. The indicators shown in Figure 7-2 include all performance indicators presently in use (based on WMD and utility survey results) and other relevant indicators.



**Figure 7-2**  
 Framework of Task-based  
 Performance Indicators  
**HAZEN AND SAWYER**  
 Environmental Engineers & Scientists

### 7.3 Qualitative Performance Measures

Qualitative performance measures that could be considered as being part of the Performance Measurement System include public response, public acceptance and ease of implementation. These measures are currently part of the decision process of many utilities when selecting among various BMPs. However, these measures are reflected in the recommended Performance Measurement System as either a goal-based measure or a task-based indicator. For example, public response is measured by the number of participants and public acceptance can be measured by customer surveys. The number of participants and customer surveys are included as task-based indicators shown in Figure 7-2. Likewise, ease of implementation and public acceptance refer to how easily a BMP can be implemented which affects the cost of the program. Program costs are included in the cost-effectiveness goal-based performance measure.

Since the only qualitative performance measures that seem to be in use and applicable to water conservation are already reflected in the Performance Measurement System presented in this report, it is not recommended to evaluate qualitative performance measures any further during the development of the Statewide Program.

## **Section 8.0**

# **Recommendations for Implementing Florida’s Public Supply Water Conservation Performance Measurement System**

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Although the content and purpose of water conservation plans vary among districts, Section 373.227, Florida Statutes ensures that WMDs will accept a utility-tailored goal-based water conservation plan if the utility can provide reasonable assurance that the proposed plan will achieve effective water conservation at least as well as the water conservation requirements adopted by the appropriate water management district, and is otherwise consistent with Section 373.223, F.S. It will take time for public water suppliers and the water management districts to gain experience with the new statute and how to provide “reasonable assurance” that “effective water conservation” will be achieved “at least” as well as standard water conservation requirements. This should be one of the key elements in the proposed new Water Conservation Guidance Document. A practical way has to be developed to sum the anticipated savings of the usual list of conservation measures and compare those savings with savings that could be realized by a utility’s goal-based plan. One challenge is that it is difficult to quantify the savings from some important conservation measures such as education programs and ordinances that would be expected in both the conventional and the new goal-based conservation programs. A second challenge is how to avoid overestimation of anticipated savings when a utility has implemented overlapping measures.

SWFWMD has per capita water use requirements in WUCAs and goals outside the WUCAs. NFWMD has per capita water use goals and SJRWMD has a case-specific consumption reduction goals. For these three WMDs, these requirements and goals could be used as the basis of comparison, at least as an interim solution. For example, a utility in the SJRWMD could estimate savings from each proposed quantifiable measure and sum the savings from each measure across the entire plan. The utility can demonstrate that the savings in the proposed plan can meet the consumption reduction goal over the specified timeframe.

If a WMD uses a percent consumption reduction goal or some other goal that requires a utility to improve upon its baseline efficiency, the goals should be utility-specific recognizing that some utilities have a history of conservation program implementation and that improving water use efficiency beyond the current level of efficiency may not be cost-effective. In contrast, a utility that has historically not implemented conservation measures should be required to obtain a higher reduction goal.

An effective goal-based system for water conservation should include: 1) Goal-based or outcome-based performance measures, and 2) Task-based or output-based performance indicators.

The goal-based approach stresses accountability and should be more accountable than conventional water conservation requirements that are not goal-based. The program is available for any utility in the state that wishes to participate. As provided in Section 373.227 (4), F.S. (enacted in House Bill 293), a water management district must approve a goal-based water conservation plan if a utility provides reasonable assurance that the plan will achieve effective water conservation at least as well as the water conservation requirements adopted by the appropriate water management district and is otherwise consistent with Section 373.223, F.S. Under this structure, there are two separate ways for a utility to meet the conservation requirements of obtaining a Water or Consumptive Use Permit. The water management districts periodically review their rules for water use permits and could make changes in their existing requirements to emphasize the goal-based approach or make it the sole means of meeting the conservation requirements for a Water or Consumptive Use Permit. In principle, a WMD, however, could choose to require the goal-based approach on a case-specific basis or possibly district-wide. As an illustration, the goal-based approach could become the single approach in different size classes or for other circumstances, like the following:

- Utilities that have reached a consumption threshold;
- Utilities of a certain size (measured by number of accounts or water use);
- Utilities that have high water use;
- Utilities with a history of not implementing conservation BMPs;
- Utilities under Consent Order; or
- Location of utility with respect to WUCAs/WRCAs.

A more flexible approach to conservation with real measured savings should provide benefits to both public water suppliers and water management districts. It will provide the utility with a stronger basis for building effective water conservation programs and demonstrating their water savings to the water management districts. The water management districts will benefit from utilities implementing more effective programs with more accountability.

Additionally, WMDs could consider requiring utilities to measure and report actual (rather than estimated) savings at an account level summed across the BMP program and utility. This could be incorporated whether a utility participates in the goal-based program or implements water conservation requirements that would be required otherwise. Requiring a five-year plan that is updated annually with measured results could help utilities achieve permit compliance, since the WMD would work with the utility on an annual basis to determine if the utility would be able to reach goals or requirements in the speci-

fied timeframe. The five-year plan could include yearly milestones with the yearly update report addressing whether or not the milestones were met. If goals are not achieved, the utility and the water management district would then work together to determine the causes of the failure recognizing that the WMDs retain the authority to enforce Section 373, F.S. and district rules and permits.

The Guidance Manual will describe the process by which a utility proposes a goal-based plan, how the goals are established, reviewed/accepted, and how progress toward reaching the goal is tracked and reported to the WMD and provided to the Clearinghouse. The Guidance Manual could also be referred to in the districts' WUP/CUP Applicant's Handbook and/or referred to in the WMDs' water resource rules.

Public workshops on the goal-based approach to water conservation should be provided so that utilities know that it exists, what the benefits are for the utility, and how to propose, measure, and report BMPs and their savings. Once the program is fully implemented, public workshops could also be used as a feedback loop for utilities and regulators to discuss implementation options and goal attainment.

The recommended approach for standardizing the terms and definitions in the Glossary (Appendix A) is to publish them informally for now. The Glossary could be available on the FDEP's Office of Water Policy website until the Guidance Document has been created. The Glossary would also be part of the Guidance Document and some terms/definitions may be adjusted during the development of the Guidance Document. Furthermore, both the Water Conservation Glossary and the Guidance Document will likely need to be updated approximate every five years as the Clearinghouse reports data and the Program is adjusted accordingly. If districts decide to include specific details in their rules about the Goal-based Program, rather than refer to state rules (that subsequently require utilities to follow the Guidance Document) or the Guidance Document directly, it is recommended that they include a definitions section in their rule changes and include relevant terms from the Glossary.