SECTION 3 – GUIDE TO WATER CONSERVATION PLANNING

This section of the Water Conservation Plan Development Guidance Document provides the reader with a step-by-step discussion of the importance of each of the nine planning steps and specific direction into how each plan step may be performed. For each planning step, the discussion begins with an overview of the planning step and its relevance to the overall water conservation planning effort. A "Model Plan" template containing a scope of work that specifies the step-by-step tasks that need to be performed is presented in Section 4 along with worksheets to assist in the planning effort.

As previously indicated, the Model Plan template as presented can be modified and amended to meet specific situations and circumstances. However, the template and the corresponding overall approach articulated in this section illustrate how an entity can achieve effective water conservation planning, which includes:

- ✓ Integrating the identification, evaluation and selection of water conservation measures and programs with water supply planning;
- ✓ Creating a planning process that allows for adaptive management of the selected water conservation measures and programs as the plan is implemented, monitored and adjusted in accordance with changing conditions and plan successes and failures; and
- ✓ Maintaining compliance with the Water Conservation Act.

STEP 1 - PROFILE EXISTING WATER SYSTEM

The first step of water conservation planning relates to understanding what the water supply system has with respect to water sources, pipe, treatment facilities, etc. as a water management entity. Profiling your existing water system therefore requires that the water manager compile all the available information that can be used to characterize your existing water system with respect to:

- ✓ The water delivery service area (including the population served, area served, number of connections, types and numbers of customers, etc.)
- ✓ The existing water service facilities (including the miles and location of pipe, number and location of production wells, treatment facilities, storage facilities, etc.)
- ✓ The existing water use by the customers (including current water delivery volumes, average and peak demand, pricing for and revenue from water sales, etc.)

Once these data are collected to establish the current "baseline conditions," comparison of predicted demands and water supply options to the baseline needs can identify future infrastructure and water supply source requirements. The importance of water conservation can then be evaluated based on the cost of new water supplies and related infrastructure.

Goal of Planning Step 1

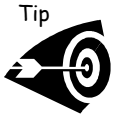
Summarize the service and operating characteristics of the water system to establish current "baseline" conditions that will be used to evaluate and frame the importance and value of water conservation in managing future water resources.

System Profile

Taking inventory of the existing water supply system is the first step in the planning process. A water system profile can help water managers assess their present circumstances and design strategies to meet emerging needs. A good system profile is an important precursor to identifying future benefits of water conservation in supporting the short and long-term management of water resources for a planning entity.

Worksheet 1-1 (in Section 4) provides a relatively simple summary table that planners can use to compile and present key system characteristics. The system profile can be expanded to include additional narrative, tabular, or graphical information. Maps showing key components of the water supply system (and wastewater system if applicable) are valuable as a visual representation of the "baseline condition".

Tip



Data May Already Exist

Most water utilities and special districts maintain the data and information necessary to establish the water system profile. Much information may already have been compiled for a facility plan or for other purposes.

System Conditions

Worksheet 1-2 provided in Section 4 helps to direct the water manager to answer questions about conditions that might affect the water system and its conservation planning effort (e.g., whether there are frequent water shortages, if significant growth is expected, etc.). These questions can be used as part of a general

review of conditions affecting the supply of or the demand for water. For planning purposes, it is important to identify the conditions that most affect a particular system.

In addition to the summary worksheet, planners also should prepare a brief written discussion of the significant conditions affecting their systems. Particular attention can be paid to climate and water availability, but other factors affecting the system can be considered as well. This information can be used to help planners identify problems and opportunities throughout the planning process.

Current Water Conservation Efforts

Worksheet 1-3 (in Section 4) may be used to assist water managers in describing their current water conservation activities and programs. For each conservation measure that has been implemented, water managers are asked to estimate the approximate annual water savings achieved, when implementation for the measure began, and whether continued implementation is planned. **Colorado's water conservation planning statute requires covered entities to include in their plans an estimate of the quantity (in acre-feet) or percentage of water saved through a previously implemented conservation plan.** This worksheet may assist in the development of other pertinent information on current efforts and their effectiveness, as well.

Tip

Conditions that May Benefit the Most from Water Conservation

While all water systems can benefit from efficiency improvements, **water conservation can be especially beneficial for systems experiencing water shortages or rapid increases in demand.** For example, water systems facing one or more of the **following conditions are strongly urged to consider the fullest range of conservation measures available to them:**

- ✓ Systems in state-designated critical water or stressed areas.
- ✓ Systems experiencing frequent droughts, emergencies, or safe yield problems.
- ✓ Systems with excessive unaccounted-for water or water losses.
- ✓ Systems entering into major construction cycles.
- ✓ Systems anticipating rapid growth in water demand.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 1 **will assist** your adherence to the following requirements of §37-60-126:

- Consideration of water-saving measures and programs;
- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

STEP 2 - CHARACTERIZE WATER USE AND FORECAST DEMAND

This step looks into the future to identify changing (presumably increasing) water demand related to expanding customer needs – because of a growing residential population or because of expanding industrial and commercial demands, or both. During Planning Step 3, the future demands will be compared to the baseline conditions established in Planning Step 1 to identify gaps in future water supply needs and estimate costs of developing new water supplies, building infrastructure and operating and maintaining the future water supply system.

Goal of Planning Step 2

Estimate the future water needs and demands of the community to help identify potential gaps in the existing water supply system. Gaps could relate to total water demand, peak demand, or a combination of both.

Water Use Characterization

Understanding the nature and dynamics of water use is essential to sound water supply planning and effective water conservation planning. A water conservation plan should characterize water use by system customers in some detail. This information will help water conservation planners identify conservation measures and programs that are appropriate for the system. Aspects of this characterization should include:

- ***Potable versus non-potable.*** If the system provides both potable and non-potable supplies, the amounts and uses should be noted, in general and with respect to the other aspects of water use discussed below. This information may suggest opportunities to use alternative supplies such as reclaimed wastewater.
- ***Customer classes.*** It is essential to understand how much water different classes of customers use, as each will have different water use requirements and will respond differently to various water conservation measures and programs. Furthermore, these differences are important to accurate water demand forecasting. A basic breakdown into residential and non-residential users is a key starting point. Further breakdowns are useful. For instance, residential use can be differentiated into single-family and various multi-family categories. Non-residential use classes include commercial, industrial, and institutional (schools, government facilities, etc.). Managers of large water systems often subdivide those classes further. The break-down of water use should include "non-account" uses as well. Non-account water includes authorized uses of water that are not billed, as well as losses and leaks (see Appendix F).

- ***Large customers.*** It is often useful to understand which customers account for the largest amounts of water use. If an entity has a number of customers (e.g., industrial or institutional water users) that use substantially more water than others, it may be very cost-effective to work with those customers to identify water conservation opportunities at their facilities.
- ***Indoor/outdoor use.*** Another basic aspect of water use is the break-down between water used indoors and that used outdoors, typically for irrigation. In Colorado, a large proportion of water use typically occurs outdoors. Outdoor use may be more discretionary than indoor use.
- ***Seasonality and other temporal aspects of water use.*** Water use in Colorado often varies by season, largely due to outdoor water demand during warm and dry periods of the year. This difference is important to identification of water conservation goals, measures, and programs. Water use may also vary by time of the week and time of the day. These variations are most important to planning and managing water storage facilities but may also be relevant to water conservation.
- ***Trends.*** Trends in water use over recent years are important to forecasting of water demand, selection of new supplies, and development of a water conservation agenda. However, planners should always remember, "trend is not destiny." Later planning steps address the use of water conservation to modify water use trends according to the needs and goals of the utility.

If the utility lacks information on any of these aspects of water use, best management practices for water system operations suggest the system managers should work toward putting in place the hardware (e.g., water meters) and software (e.g., customer water use record-keeping systems) that provide it. Clearly, the larger and more diverse the customer base of the water system, the more the need for such record-keeping.

This guidance document recommends that planners prepare forecasts for five-year, ten-year, and twenty-year intervals. Additional time points can be included as well. The longer the planning horizon, the greater the uncertainty of the forecast. Forecasts should be revisited and updated on a regular basis.

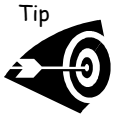
Demand Forecasting

Forecasting water use (or water demand) is a critical part of the planning process. Forecasts can range from simple projections based on anticipated growth in the population to complex models using several variables to explain variations in water use. Forecasts can be made for a water system as a whole; however, forecasts are

considered more accurate when they are prepared for separate classes of water users.

The potential effects of new water conservation efforts selected in this planning process should not be included in the demand forecast prepared during this step. Demand forecasting at this point should look at continuation of the status quo related to water conservation efforts and "passive conservation" as older fixtures and appliances wear out and are replaced with models that meet current efficiency standards.[1] A revision to the demand forecast based on implementing the planned conservation measures is made in Planning Step 7.

Tip



Water conservation measures and programs can be performed to address various end-points, such as per-capita or per-connection water use; reduction in peak demand; etc. Therefore, future demand estimates should include analyses of all those factors that may influence the identification of water conservation goals and selection of water conservation activities.

Forecasting Method

Planners should use, at a minimum, the forecasting technique provided in Worksheet 2-1 (in Section 4). This approach separates residential and nonresidential customers. The forecast can be made on a per-capita or per-connection basis. For the nonresidential sector, planners should use employees, jobs, or another appropriate explanatory variable.

Planners may use demand forecasts previously prepared (within a few years) for other planning efforts if the method was at least as detailed as the method used in Worksheet 2-1.

Considering customer classifications can refine the water demand forecast. For example, based on a more detailed water use characterization, the nonresidential class can be subdivided into the commercial and industrial classes (as well as wholesale water customers). A separate forecast also should be prepared for non-account water, or water that does not produce revenues for the system, including leaks and other losses (see Appendix F).

Planners also should estimate average-day and maximum-day demand over the planning horizon. This distinction helps address the seasonality of water use. As discussed for Planning Step 3, different

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[1] The "natural replacement" of fixtures and appliances should be accounted for in demand forecasts and conservation program development; otherwise, savings that would occur naturally may be double-counted, and water systems may pay for replacements that customers would make on their own. However, such payments are not necessarily undesirable. If a water system has a need to speed the pace of fixture and appliance replacements—e.g., in order to avoid or postpone a costly water supply investment—it may be worth paying for replacements in the near-term that would otherwise occur naturally over a longer term.

types of supply-side facilities are designed to meet different water demands (peak or average), and various conservation measures target different types of demand.

Each of the forecasts should be subjected to a basic "what if" alternatives analysis to address potential variability in the level or pattern of future water demand. The forecasts should take into account and the plan should explain any known, planned, or measurable changes that will affect demand, *with the exception of the conservation measures contemplated in these guidelines.* Adjustments to the forecast based on expected savings from conservation will be made in Planning Step 7.

This method of forecasting is very simple and limited. While it takes into account variation in water-use by customer class, the method also assumes that unit use (use per person, household, place of business, and so on) does not vary over time. More sophisticated approaches to demand forecasting are available and planners are encouraged to use them.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 2 **will assist** your adherence to the following requirements of §37-60-126:

- Consideration of water-saving measures and programs;
- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

STEP 3 - PROFILE PROPOSED FACILITIES

This planning step is used to combine the first two planning steps in a comparative analysis such that gaps in future water supply needs (without the benefits of water conservation) can be identified and the costs for developing, operating and maintaining the water and associated infrastructure can be estimated.

Goal of Planning Step 3

Describe improvements planned for the system over a reasonable planning horizon, identify the types of improvements proposed, and estimate the total, annual, and unit cost of the improvements.

Supply Forecasting

In this part of the conservation plan, planners are asked to prepare an estimate of supply costs based on meeting the level of water demand specified in an unadjusted demand forecast (the forecast prepared in Planning Step 2). **This is a critical part of the analysis because it establishes the anticipated cost of *supply-side* improvements and additions and this cost estimate can be used to represent the value of conservation or *demand-side* activities.**

Because the benefits of conservation extend into the future, it is important to take a forward-looking approach to supply costs. The concept of marginal or incremental cost captures the idea that the "true" value of a supply resource can be measured in terms of the cost of the next increment of supply. If only high-cost supplies are available, the marginal or incremental cost will be high. For many communities, future increments of supply will be very costly. The value of a conserved amount of water at a future point in time will be equivalent to the least costly supply option available at that future point if the supply option is being eliminated, reduced, or postponed by conservation.[2]

Water Conservation can save money by reducing the need for future water and wastewater system capacity.

Conservation can also reduce needs for wastewater system capacity. If the water and wastewater systems in the community are managed by the same entity or department of government, planners should certainly include new wastewater facility capacity in the analyses in this planning step. If wastewater facilities are managed by a separate entity or department, water system planners are encouraged to coordinate the preparation of the analyses with the wastewater system.

This chapter focuses on defining the needs and costs for future facilities and water purchases. The value of future water conservation will include reducing these needs and their related costs. There may be other reasons to implement water conservation measures and programs, as well. The planning entity will consider these and other reasons for conservation in the planning steps that

[2] The comparison should be to the least costly supply option among all options under consideration if one has not yet been chosen; otherwise, it should be the option that is currently planned. If multiple projects are necessary to provide the required supply, the comparison should be to the "last" increment of supply—meaning the most costly increment—again using the least costly of the options for that increment or the option that is actually planned.

set conservation goals (Step 4) and select water conservation measures and programs (Step 6).

Facility Needs Analysis

A reasonable accounting of anticipated facility needs and costs is needed in order to compare the cost of supply-side measures to the cost of demand-side or conservation measures (on a cost-per-gallon basis) which will occur in Planning Step 7. Planners should choose an appropriate time horizon; a twenty-year or other suitable period can be used. The choice of timeframe should be consistent with the demand forecast (Planning Step 2), as well as other planning considerations (e.g., period for bonding; expected construction planning horizon; etc.).

Planners should begin by preparing an estimate of major improvements and additions that will be required over the planning horizon in order to meet anticipated demand, including a safe reserve margin. Detailed information may be available from existing facility plans, water supply master plans, or other planning documents. Worksheet 3-1 (in Section 4) can be used to summarize improvements and additions.

Planners should consider all capital facility improvements and additions. Improvements include renovations and expansions needed to maintain or enhance safety or reliability within existing facilities. Additions consist of new facilities. Routine maintenance should not be included. Wastewater facility needs should be considered and included. Anticipated water purchases and costs also should be recorded on Worksheet 3-1. **For this part of the analysis, the effects of conservation measures currently being implemented should be considered, but the effects of new conservation measures on the need for supply capacity or water purchases should be excluded since this is addressed as part of a later planning step (Planning Step 7).**

Demand Management Issues

Supply-side facilities are designed to meet different types of water demand, as summarized in Table 1. Similarly, different conservation measures affect different types of water demand. Planners should identify, as reasonably possible, the extent to which improvements and additions are needed to meet average and/or peak demand and/or wastewater facility needs.

Table 1: Relationship of Water Demand to Supply Facilities

Type of Water Demand	Type of Water Supply Facility
Average-day	Source of supply facilities, including raw water storage facilities (such as reservoirs)
Maximum-day (peak)	Water treatment plants Major transmission lines
Maximum-hour [a]	Treated water storage facilities Distribution mains [b] Pumping stations [b]

Source: Adapted from Howe and Linaweaver (1967).

[a] Maximum-day demand plus fire-flow requirements.

[b] These facilities should be considered in the analysis if they could be affected by such conservation measures as leak detection and repair, pressure management, or integrated resource management.

Capital-cost reductions associated with conservation will depend on the extent to which facilities and water purchases can be eliminated, postponed, or downsized. The effect of conservation on the need for facilities will depend on the demand pattern of the system (which was described in Planning Step 2), as well as its construction cycle (that is, the timing of when facilities currently under development or design will be put into use). Conservation can be particularly beneficial for systems that have a sufficient planning horizon to integrate conservation with conventional resource options. In some cases, capital costs cannot be avoided but conservation can still yield savings in operating expenditures. A degree of analyst judgment is required in order to evaluate incremental costs and to integrate supply-side and demand-side resources.

If no capital improvements and additions or water purchases are planned, "zero" values can be entered and the estimate of costs in the next section can be based on operating costs (including the cost of energy, chemicals, and purchased water).

Estimating Incremental Facility Costs

Worksheet 3-2 in Section 4 provides a method for placing a value on supply-side improvements and additions. Improvements and additions are separated into four categories: source of supply, water treatment facilities, treated water storage, and major transmission lines. Water purchases are separately recorded. Wastewater facility costs should also be considered by adding one or more columns to Worksheet 3-2, or through a separate analysis and presentation

Using this worksheet, capital costs over the useful life of the anticipated projects (including financing costs) are *annualized* and reported on a per-gallon basis. Financing costs can be incorporated into the calculation of annualized cost by using the expected interest rate for financing the project(s) or the system's overall cost of capital. Added to the annualized capital cost forecast is the variable operating cost-per-gallon of production for existing and planned facilities, including costs associated with energy, chemicals, and existing and new water purchases. **The sum of the annualized capital and variable operating costs, on a per-gallon basis, is considered to be the total annual incremental cost.** The total annual incremental costs by type of facility for both peak and average demand situations can be used by planners to arrive at a simple estimate of incremental supply costs, which can later be compared to the unit cost of implementing conservation measures.

This approach produces a very rough estimate of the value of supply-side options. Costs generated using this approach are not escalated (to account for the increasing value of water-supply resources over time), discounted (to account for the time value of money), or adjusted for inflation. To include these factors, an economic cost of incremental supply projects can be developed by using Worksheet 3-3 (in Section 4), which is provided as an alternative to Worksheet 3-2. If Worksheet 3-3 is used, it must be completed for each incremental project separately, due to likely differences in cost profiles and economic factors over time. A version with all chosen projects

summed, or versions grouped by projects to meet average demand and those to meet peak demand, can be developed once the cost profiles of each individual project are known. Wastewater facilities can be included with separate versions of Worksheet 3-3 for each project, or with another analysis.

Preliminary Supply-Capacity Forecast

The final task in this planning step relates to developing a preliminary forecast of total water supply capacity over time. Worksheet 3-4 (in Section 4) is provided to help planners prepare a preliminary forecast of total water supply capacity over the planning period based on the anticipated capital improvements and water supply additions identified through the completion of this planning step. The forecast, which can be presented in a table or graph, can be used to indicate when changes to capacity are expected to occur. The total supply forecast should reflect both additions to capacity and retirements. Improvements that allow the system to maintain capacity can be indicated with entries under both additions (to reflect the improvement) and retirements (to reflect the facilities taken out of service). A similar analysis and format can be used for wastewater capacity.

The capacity forecast(s) is *preliminary* because it can and will be revised later in the plan to reflect the effect of conservation on water supply needs.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 3 **will assist** your adherence to the following requirements of §37-60-126:

- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

STEP 4 - IDENTIFY CONSERVATION GOALS

Water conservation is not an end in itself. Planners should specify how water conservation fits with the needs of the water system and its customers. Often this means setting goals for achieving water savings that an entity identifies as being either:

- ✓ Required to balance future water demand with future available water supply; or
- ✓ Cost-effective based on the incremental or marginal costs of new water supplies.

Other benefits of water conservation may be incorporated into goal statements. In all cases, water conservation goals should provide a "yardstick" for measuring the effectiveness of the conservation plan's implementation.

Goal of Planning Step 4

Develop reasonable, measurable water conservation goals based on anticipated benefits for the water system and its customers.

Setting goals related to the amount of water that "will be saved" through future conservation efforts is a requirement of the Water Conservation Act of 2004.

Planning Goals

Planning goals can be developed from different perspectives. This guidance document and the worksheets for analysis of the benefits and costs of conservation activities emphasize a water supplier perspective. For a water supplier, the value of conservation is defined primarily in terms of avoided supply-side costs to the water system. Lowering the level of water demand can help water suppliers avoid, downsize, or postpone the construction and operation of costly supply-side facilities.

Water savings goals can be based on the desire to:

- ✓ Reduce total water demand;
- ✓ Reduce per-capita water use;
- ✓ Reduce per-connection water use;
- ✓ Reduce peak demand water use; or
- ✓ Some other metric.

Colorado's water conservation planning statute requires that a water conservation plan state "the covered entity's best judgment of the role of water conservation plans in the covered entity's water supply planning." It is appropriate to develop and state this judgment in the context of developing water conservation goals.

The benefits of conservation also can be understood from the perspectives of customers, as well as society at large. Conservation benefits society by preserving environmental resources. Conservation can benefit customers by lowering energy costs and long-term water costs. Water conservation also reduces demands on

wastewater systems; in fact, the need to reduce wastewater treatment costs can be a strong rationale for water conservation. An entity's water conservation plan can be used to simultaneously address the potential effects of conservation on water and wastewater operations.

Conservation planning goals can take many forms. Water providers should state their goals in terms that are measurable, achievable, and reasonable, and have a specific time frame. This would typically include discussion of the goals relative to system conditions (i.e., as discussed in Planning Step 1), anticipated water demand (Planning Step 2), and anticipated needs for facilities and/or water purchases (Planning Step 3).

Planners should plan on revisiting the goals section before finalizing the conservation plan and periodically thereafter, because goals and the means to achieving them will evolve.

Water conservation planning goals may be related to some or all of the following:

- ✓ Eliminate, downsize, or postpone capital projects and water purchases.
- ✓ Improve the utilization and extend the life of existing facilities.
- ✓ Lower variable operating costs.
- ✓ Avoid new source development costs.
- ✓ Improve drought or emergency preparedness.
- ✓ Educate customers about the value of water.
- ✓ Improve reliability and margins of safe and dependable yields of current water supplies and related treatment works and/or conveyance and distribution systems.
- ✓ Protect and preserving environmental resources.
- ✓ Comply with regulatory and programmatic requirements of governments.

Community Involvement

The process of developing goals can involve representatives of various groups in the community (or stakeholders) who may be concerned about a water system and its future. Modern water resource planning emphasizes an open process that involves all affected groups so that they can have an opportunity to express their interests and concerns.

Involving the community in goal development also serves an important public education function. Moreover, it is widely believed that involving the community in developing goals, as well as in the implementation process, can greatly enhance the success of conservation programs.

Members of the community who might be interested in water conservation include:

- ✓ Residential water consumers
- ✓ Commercial water consumers
- ✓ Industrial water consumers
- ✓ Wholesale customers
- ✓ Environmental groups
- ✓ Civil rights groups
- ✓ Labor groups
- ✓ Business and commerce groups
- ✓ Recreational water users
- ✓ Agricultural users
- ✓ Educational institutions
- ✓ Government agencies
- ✓ Indian Tribes

In addition to helping water managers specify planning goals, community participants also can have an ongoing role in the implementation of the selected conservation measures and programs. Ongoing involvement can help maintain and build support for achieving conservation goals and can help "get the word out" about the conservation effort. Participants can act as a focus group for exploring specific conservation measures and/or programs. Participants also can provide valuable linkages to key groups—consumers, businesses, and institutions—who might be involved in implementing certain conservation measures. Participants also can provide input on the level of satisfaction or dissatisfaction with the entity's programs. Finally, community groups can assist the water managers in monitoring results and adjusting program implementation.[3]

Public participation builds the capacity of communities to plan for and implement meaningful water conservation. Planning Steps 8 and 9 encourage an ongoing role for the public, as well.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 4 **will assist** your adherence to the following requirements of §37-60-126:

- Consideration of water-saving measures and programs;
- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

This planning step **is required** to fulfill §37-60-126 (4e) which relates to developing goals for water conservation plan implementation.

STEP 5 - IDENTIFY CONSERVATION MEASURES AND PROGRAMS

The process of selecting appropriate water conservation measures and programs begins with a broad-based inventory and review of all water conservation measures and programs available to the water utility or district for implementation. Once the completed list has

[3] See *Public Involvement Strategies: A Manager's Handbook* (American Water Works Association Research Foundation 1996).

been developed, it is screened, based on some preliminary assessment criteria, to develop a list that will be carried to Planning Step 6.

Goal of Planning Step 5

Review possible conservation measures and programs and screen the list into those specific measures and programs that are aligned with the planning entity's goals and resources.

Identification of Measures and Programs

Development of a water conservation plan involves first identifying the "universes" of conservation measures and programs that may be appropriate for the utility or district.

Conservation measures include both demand-side and supply-side approaches for saving water or increasing the productivity of water supply and use. Demand-side measures occur at the level of water users, which include water customers and other authorized users such as municipal parks. Demand-side measures include actions that increase the technical efficiency of water use (e.g., toilets that use less water per flush, or irrigation scheduling that reduces excess watering) and choices that require less water, such as replacing Kentucky Bluegrass with xeriscape. Supply-side approaches occur at the utility or district level. They include system efficiency measures such as repair of leaks in water distribution lines and conjunctive use of surface and ground water supplies, and source substitutions that stretch water supplies, such as water reuse.

Did you know?

Conservation *measures* are specific technologies or practices that directly reduce water use. The customer rather than the water provider itself must implement demand-side measures. For instance, it is ultimately the customer who replaces an old toilet with a water-efficient model. On the other hand, the water provider implements supply-side measures, such as leak repair.

Conservation *programs* are the activities that a water provider or local government undertakes to encourage or require conservation measures. For example, the utility or district can offer rebates to customers who replace old toilets. Programs don't by themselves save water. For instance, a leak identification program does not save water. It is, of course, a key precursor to leak repair, a measure that does save water.

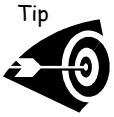
Conservation programs range from relatively simple educational tools to sophisticated incentive schemes that promote advanced water-efficient technologies. Some programs are actions the water utility or district can implement entirely on its own; for instance, improving water accounting systems and identifying water losses. Other programs are focused on the water users, including education, regulations, and incentives. Use of any particular program and the measures it addresses depends on whether it meets cost-effectiveness and other planning criteria and whether its use complies with applicable laws and regulations,

including state and local plumbing codes. Appendix B provides basic explanations of a number of measures and programs.

Worksheet 5-1 (Section 4) **lists *measures* that are required to be considered under Colorado's water conservation planning statute**, as well as some measures recommended for consideration. **Worksheet 5-2** (Section 4) **lists *programs* that are required to be considered under Colorado's water conservation planning statute**, and some programs recommended for consideration. You can use these worksheets to review and summarize the measures and programs that are currently implemented, and those that are considered and evaluated in the conservation plan (including re-evaluation, if appropriate, of previously implemented measures).

It is important to note that the measures and programs in these two worksheets are highly generic. For instance, rebates are a type of incentive listed on the program worksheet (5-2). However, rebates can be focused on many different types of measures (toilets, clothes washers, irrigation controllers, etc.). It is recommended that you add additional rows and additional descriptive information for the specific measures and program/measure combinations you consider. Further detail in the narrative for this planning step is also appropriate. In the next planning step, you will need to be very specific in defining your programs, including the measures they focus on, in order to determine likely costs and water savings.

Tip



Sources of additional measures and programs include the **Metro Mayor's Caucus and Colorado WaterWise Council Best Management Practices for Water Conservation and Stewardship** in Appendix C and the other resources listed in Appendix E.

Many additional conservation measures and programs exist that are not listed in Appendix B or Worksheets 5-1 and 5-2. They include specific sub-types and variations on the higher-level categories of Worksheets 5-1 and 5-2. Planners are encouraged to explore the full range of potential conservation measures and programs for consideration in the conservation plan.

Screening Measures and Programs

Once a list of possible measures and programs has been identified, the entity will need to screen them based on:

- ✓ The degree to which the measures and programs match the entity's conservation goals; and
- ✓ The general feasibility of the measures and programs given the entity's specific situation and available resources.

For instance, if the goal is to use conservation to reduce the need for new supplies to meet peak seasonal demand, typically planners should look closely at a variety of measures that reduce irrigation water demand, such as xeriscape, water-efficient irrigation equipment, and improved irrigation scheduling.

Once a range of appropriate measures have been identified, water conservation planners should consider a variety of programs that would result in implementation of the measures. Continuing with the previous example, the entity could consider educating customers on proper irrigation scheduling, providing rebates for installing more water-efficient irrigation equipment, and incentives to encourage use of xeriscape.

Planners can screen measures and programs in terms of general feasibility. In some cases, it may not be possible for a water provider to implement a measure or program because of legal restrictions or for other compelling reasons. For instance, if the entity is not a local government, it will not have the power to adopt ordinances, though it could work with the local government to see ordinances put in place. Other feasibility screening criteria could include technical feasibitity, regulatory acceptance, ease/difficulty of implementation, and public acceptance.

The conservation plan should provide an explanation if a required measure or program, or others that are identified (for instance, ones brought up in a public participation process), cannot be implemented for the period of time covered by the plan. It is not necessary to prepare further evaluations (e.g, cost effectiveness analysis) for measures that cannot be implemented. Worksheets 5-1 and 5-2 provide a space for indicating the key reason(s) certain conservation measures are not evaluated further in the plan.

A good conservation plan will also include appropriate narratives that support public review and input into the planning process. To facilitate public involvement, the plan should include as part of this step:

- ✓ An explanation of how conservation measures and programs were identified; and

- ✓ A description of any general screening criteria used to eliminate some measures and programs from further consideration.

Finally, a listing of those measures and programs that will be evaluated in Planning Step 6 should be provided.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 5 **will assist** your adherence to the following requirements of §37-60-126:

- Consideration of water-saving measures and programs;
- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

This planning step **is required** to fulfill §37-60-126 (4a) which relates to considering various water-savings measures and programs.

STEP 6 - EVALUATE AND SELECT CONSERVATION MEASURES AND PROGRAMS

This planning step involves analyzing the benefits and costs of candidate water conservation measures and programs in order to select those that will be implemented by the planning entity. Planners will also consider criteria other than economics. Later, in Planning Step 7, planners will estimate the effects of conservation on planned capital facilities and water purchases.

Goal of Planning Step 6

Use cost effectiveness analyses and other evaluation criteria to compare and ultimately select water conservation measures and programs for implementation.

Water Savings

Worksheet 6-1 in Section 4 should be completed for each conservation program (supply-side and demand-side) and each supply-side conservation measure identified in Planning Step 5 as appropriate for further consideration. Since demand-side measures cannot be implemented by the water utility itself, planners need only include demand-side measures in worksheets for demand-side programs that target the measures. For instance, planners would not

develop a worksheet for toilet replacements per se, but would incorporate estimates of customer toilet replacements into worksheets for rebate programs or other programs directed at achieving toilet replacements.

Planners should combine measures and programs based on the implementation approach they envision. **All interrelated measures and programs that are expected to result in an identifiable amount of water savings should be combined and treated as one program in order to avoid counting the planned water savings more than once in the analysis, and to avoid double counting of costs that can be shared across multiple measures or programs.**

Worksheet 6-1 begins with an open-ended description of the measure/program, an estimate of water savings, and the planned number of installations of the measure. The anticipated life span for the measure should be indicated. Planners also should indicate whether the measure is targeted toward reduction in average-day demand, maximum-day demand, or both. Estimates of potential water savings should be as realistic as possible, based on system and regional considerations. For some measures, particularly those dependent on customer responses (such as information and education programs), the estimation will reflect a high degree of uncertainty. Planners can choose to use a range of estimates under these circumstances.

Implementation Costs

Worksheet 6-1 includes a method for summing the total cost of implementing the measure. All costs associated with implementation should be included. Planners should obtain reasonable cost estimates by potential vendors whenever possible. The types of costs that should be analyzed include:

- ✓ Materials
- ✓ Labor
- ✓ Rebates or other payments
- ✓ Marketing and advertising
- ✓ Administration
- ✓ Consulting or contracting
- ✓ Other

A realistic implementation schedule should be considered. Any special circumstances affecting the schedule or cost of implementing the proposed measures should be discussed in the plan.

Each worksheet also includes a place to estimate annual unit water savings (that is, savings per measure or "unit"), total annual water savings, and total life span water savings for the measure. For each measure, the method used to estimate water savings should be provided. This might include, for example, a formula for converting daily per capita savings to annual savings. In some cases (such as a leakage control program), it might not be feasible to estimate savings for each unit, in which case total annual savings for the entire measure are sufficient.

Cost-Effectiveness

Analyzing benefits and costs is an invaluable part of the planning process. A *cost-effectiveness* analysis can be used to compare alternative conservation measures and programs in terms of dollars per gallon of water saved. For example, one option might produce savings at a cost of $.25/1,000 gallons while another produces savings at a cost of $.50/1,000 gallons. Often it is useful for planners to rank options in order of their cost-effectiveness.

Cost-effectiveness analysis also can be used to compare conservation options to supply options. This builds on the identification of supply costs in Planning Step 3. For instance, the cost of conservation (for example, $.50 per 1,000 gallons saved) can be compared to the simple incremental cost of supply (for example, $2.00 per 1,000 gallons produced). The difference between the per-gallon cost of conservation and the per-gallon cost of supply is a simple indicator of the potential benefits (or cost savings) from conservation. This simple *net benefit* analysis can be used to determine whether the benefits of implementing a measure or program outweigh the costs.

It is not necessary for planners to prepare a cost-effectiveness or net benefit analysis of measures that are chosen for reasons other than cost-effectiveness in comparison to supply options (see "Evaluation and Selection Criteria" below). However, an analysis should be presented if cost-effectiveness is the basis for rejecting a measure. If the analysis leads the planner to conclude that a proposed measure is not cost-effective or that it fails to meet other criteria for implementation, the plan should include an explanation of these findings and conclusions in Worksheet 6-3 (as described below).

Net Benefits

In the worksheets, the value of implementing a conservation measure is estimated by using the simple incremental cost of supply. In other words, the benefits of conservation can be measured in terms of the potential to avoid supply-side costs.

The net benefit from implementing the measure is shown by subtracting total program costs from total program benefits (the dollar value of water saved). When benefits exceed costs (assuming that costs and benefits are adequately specified), a measure is considered reasonably efficient and a good candidate for implementation. However, as discussed below, the selection of measures can be based on additional considerations.

Worksheet 6-2 (in Section 4) can be used to compare the individual analyses of conservation measures in Worksheet(s) 6-1. This worksheet assists in evaluating measures on the basis of the relative cost-effectiveness and net benefits associated with each measure.

It is important to note that the approach above and in the corresponding worksheets should not be taken to imply that conservation measures should be accepted or rejected simply on the basis of whether each measure is more or less expensive than the incremental cost of water supply. A sound approach is to look at the cost of a suite of conservation measures in comparison to specific supply project savings they would produce. It may be economic to implement conservation measures that are higher cost than the preliminary incremental supply cost if those measures combined with other lower cost conservation measures are less costly in total than an increment of supply that they could allow an entity to avoid, postpone, or downsize if the conservation measures are implemented. Furthermore, other selection criteria can trump a simple economic evaluation, as discussed next.

Criteria that can be used in selecting conservation measures for implementation include:

- ✓ Program costs
- ✓ Cost-effectiveness
- ✓ Ease of implementation
- ✓ Budgetary considerations
- ✓ Staff resources and capabilities
- ✓ Environmental impacts
- ✓ Ratepayer impacts
- ✓ Environmental and social justice
- ✓ Water rights and permits
- ✓ Legal issues or constraints
- ✓ Regulatory approvals
- ✓ Public acceptance
- ✓ Timeliness of savings
- ✓ Consistency with other programs

Evaluation and Selection Criteria

The worksheets in this document take a somewhat narrow view of benefits and costs, both of which are considered from the perspective of the water supplier. The analysis excludes other potentially important perspectives: water consumers, society, and the environment. Planners should keep in mind that the cost-effectiveness approach may somewhat understate certain types of

benefits and costs. Other evaluation criteria may be appropriate and necessary.

The first step in the selection process is to identify criteria for evaluating the conservation measures. The cost-effectiveness of the measures is one criterion, but other factors should be considered as well. Planners are free to consider as many selection criteria as they believe are appropriate, but the relevance of the criteria should be explained in the conservation plan.

For each selection criterion used, planners should identify whether, how, and why the factor affects the feasibility of implementing one or more conservation measures. In addition, different factors might be assigned different weights. Planners also may want to consider that techniques can be used to mitigate adverse effects and improve acceptance of measures. A cost-effective conservation measure should not be dismissed without careful consideration of how barriers to implementation might be overcome.

The conservation plan should discuss the criteria used for selecting measures, the procedure for their application to evaluation of measures, and the results of this evaluation.

Selecting the Measures

Worksheet 6-3 (Section 4) provides a simple format for summarizing the selection of measures. For each measure, planners should indicate whether the measure was selected for implementation. Planners also should identify the primary reason or reasons for selecting or rejecting the measure. Special conditions or actions that are required before a selected measure can be implemented (such as an approval from regulators) should be noted.

In some cases, planners may conclude that a measure (or measures) cannot be implemented because of a constraint that exists in the short term. Conservation measures that might be planned for future implementation, once constraints are resolved, should be discussed in the plan. Planners should briefly discuss their implementation strategies with respect to such measures.

For the conservation measures selected for implementation, planners should estimate the expected reductions in average-day and maximum-day demand. These estimates will be used in the next

section of the plan to integrate conservation savings with the entity's plans for supply-side facilities. **Colorado's water conservation planning statute requires covered entities to include in their plans an estimate of the quantity (in acre-feet) or percentage of water that will be saved through conservation when the plan is implemented.**

STEP 7 - INTEGRATE RESOURCES AND MODIFY FORECASTS

Information compiled through the completion of Planning Step 6 **will assist** your adherence to the following requirements of §37-60-126:

- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

This planning step requires that planners revise the demand and supply-capacity forecasts made during Planning Steps 2 and 3 by incorporating anticipated conservation savings. This may enable adjustments to supply plans and integrates both supply management and demand management activities, resulting in an optimized, cost-effective water system.

Goal of Planning Step 7

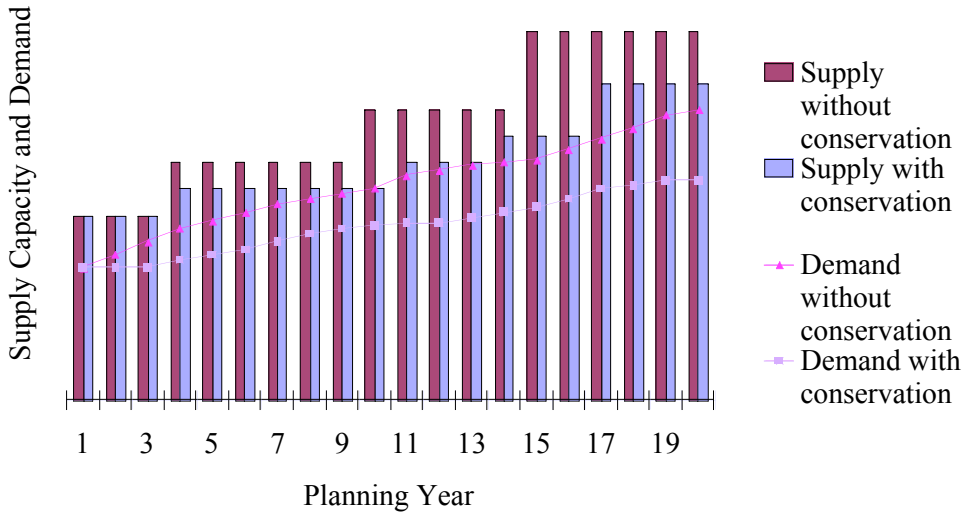
Modify water demand and supply-capacity forecasts to reflect the anticipated effects of conservation. Indicate whether and how water savings from conservation will allow the system to eliminate, downsize, or postpone new facilities or water purchases.

Overview

Planners should begin this step by modifying the demand forecast(s). They can then examine the effects of conservation on specific supply-facility projects, water purchases, and other requirements related to water demand such as wastewater facilities.

Planners should be cautious to avoid counting demand-side or supply-side resources more than once in the analysis. Anticipated savings from conservation should be based on realistic estimates of savings associated with the planned measures and programs. Similarly, supply projects that involve multiple facilities should be considered in terms of the total water supply capacity that is made available through those combined facilities. Timing is another issue. The plan should address how different supply-side and demand-side projects involve different life spans and implementation schedules. One twenty-year supply-side project, for example, might be offset by a series of conservation measures that begin and end at different times.

Figure 4-1
Sample Graph of Modified Supply and Demand Forecasts
Based on Implementing Conservation Measures



Conservation plans often use a graph to display anticipated annual demand and supply capacity requirements with and without the implementation of conservation measures. The figure provided below is an example of this type of graph for a twenty-year planning horizon. It summarizes much of the work done to this point in the conservation planning process.

Modifying Demand Forecasts

Planners can use Worksheet 7-1 (in Section 4) to collate information from previous worksheets and analyses in order to revise the demand forecasts made in Worksheet 2-1. Revisions should reflect changes based on the introduction of *new* conservation measures. The

effects of measures already being implemented should be included in the original demand forecast.

Project-Specific Savings

Planners should identify the anticipated effects of conservation on proposed supply-side improvements and additions and other demand-based requirements specified in Planning Step 3. Worksheet 7-2 (Section 4) is provided for this purpose. A worksheet should be completed for each project as appropriate, including water purchases. Ideally, water conservation strategies that reduce demand will translate into supply-side or wastewater facility savings through one or more of the following actions:

- ✓ Eliminating the need for a project over the selected planning horizon
- ✓ Downsizing a project based on reduced capacity needs
- ✓ Postponing a project
- ✓ Eliminating, reducing, or postponing water purchases

Tip

Modifying the demand forecast requires a considerable degree of judgment, particularly in estimating the effects of conservation on average-day and maximum-day demand. The plan should include an explanation of the approach used in revising the demand forecasts.

Adjustments to supply-capacity planning must be realistic, especially in terms of complex and sometimes competing goals. Supply projects cannot be eliminated, downsized, or postponed if doing so would compromise public health or safety, reduce operational efficiency, or inflate costs beyond a reasonable amount. Some entities (including those that currently operate with inadequate or unreliable supply reserves) may not be able to translate all demand reductions into supply-capacity reductions. Planners should identify and describe such circumstances. On the other hand, supply projects that are not needed or oversized place an unnecessary burden on entities and their customers. Similar considerations are necessary for adjustments to wastewater facility plans.

Tip

Public involvement in the water conservation planning process can help customers **overcome and prepare for "rate shock"** as utilities and districts adjust pricing to maintain and sustain appropriate cash flow to pay for improvements, operations and maintenance.

Modifying Supply Forecasts

Once supply-side adjustments have been identified and made based on demand-side reductions, the supply-capacity forecast can be revised using Worksheet 7-3 (Section 4). The revision to the supply-capacity forecast should be based on Worksheet(s) 7-2 and consistent with accepted supply-capacity planning practices. The modification of forecasts should reflect reasonable assumptions about anticipated conservation measure implementation schedules,

which are summarized in Planning Step 8. Planners should also indicate the anticipated capacity reserve (the difference between forecast supply capacity and demand).

Worksheet 7-3 also provides a method of summarizing savings in capital and operating costs, based on reductions in supply capacity. Planners also should estimate reductions in operating costs at *existing* facilities that will occur with demand reductions (apart from operating costs associated with planned facilities). The total program cost of conservation can be compared with the savings in total capital and annual operating costs.

As recognized throughout this document, water conservation also has non-monetary benefits. Planners should discuss, as appropriate, how implementation of the conservation plan will help their utility cope with any of the conditions identified in Planning Step 1 (Worksheet 1-2) or goals identified in Planning Step 4. For example, the planned measures and programs might help a utility address problems related to safe yields or drought management.

Revenue Effects

The conservation plan should describe how planned conservation measures will affect water utility revenues (based on reduction in sales) and discuss strategies for addressing these revenue effects. Conservation will help the water utility reduce variable costs (such as energy, chemical, and purchased water costs). In the long term, conservation also will help the utility reduce fixed costs associated with new capital facilities. However, in the short term, reductions in water sales due to conservation can lead to a shortfall in revenues needed to cover fixed costs and sustain the financial viability of the water system. **Shortfalls in revenues can have substantial, and detrimental, impacts on a water utility or district if not properly managed.**

The planner can estimate the effect of conservation on revenues by multiplying current water rates by the adjusted level of sales (for the variable portion of the water bill). The adjusted level of sales should include the anticipated effects of conservation. Conservation-oriented rate structures also have direct revenue effects that should be considered.

Conservation planners should work closely with financial planners in order to integrate their analyses, identify potential revenue shortfalls, and devise strategies to ensure that the utility will meet its revenue requirements. Adjustments to water rates may be needed. For some utilities, a change in rates requires approval from an oversight board or state public utility commission. When rate increases are offset by usage reductions, customer bills and utility revenues can be maintained. Customers and utilities eventually will realize savings from conservation through long-term reductions in costs.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 7 **will assist** your adherence to the following requirements of §37-60-126:

- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals; and
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities).

STEP 8 - DEVELOP IMPLEMENTATION PLAN

In this final step in the conservation planning process, the planning entity (i.e., water utility or district) specifies its strategy and timetable for implementation of the plan. This should include recognition that effective water conservation requires an *ongoing, adaptive management-type* effort on the part of the planning entity and its customers, to monitor, evaluate, revise and update the water conservation plan as it is implemented to:

- ✓ Adhere to the requirements of the Act; and
- ✓ Best serve the needs of the water utility or district and those it serves.

Goal of Planning Step 8

Present a strategy and timetable for implementing conservation measures and other elements of the conservation plan, including monitoring and evaluation of water conservation activities and revision and updating of the conservation plan.

Implementation of Measures

Worksheet 8-1 (in Section 4) is a simple template for summarizing the entity's implementation and evaluation schedule for the conservation measures and programs. For each measure or program, the schedule identifies significant implementation actions, an anticipated beginning date, and a completion date. Implementation actions include, but are not limited to:

- ✓ Securing budgetary resources
- ✓ Hiring of staff
- ✓ Procurement of materials
- ✓ Agreements with suppliers or consultants
- ✓ Acquisition of permits or other approvals from regulatory agencies
- ✓ Legislative actions (for changes in water-use regulations)
- ✓ Activity milestones (for example, system audits or distribution of retrofit kits)

Tip

Implementation and ongoing planning go hand in hand. Three areas are critical for maximizing the ongoing effectiveness of water conservation:

- ✓ Public participation
- ✓ Monitoring and evaluation
- ✓ Plan updates and revisions

Colorado's water conservation planning statute requires a covered entity to include a discussion of the steps the entity will use to implement the conservation plan, and a schedule for its implementation.

Planners should make note of any specific factors or contingencies that might affect or prevent the implementation of specific measures or programs. For example, if a program cannot be implemented prior to obtaining a special permit or other authority, this fact should be noted along with an explanation of the strategy for obtaining the necessary authority.

Some measures and programs might require implementation actions that take place over several years (in order to sustain conservation savings). The plan should provide sufficient detail to understand the utility's strategy with regard to implementing such activities.

Public Participation

The conservation plan should also address public participation in the implementation of the conservation plan. At a minimum, water managers may want to schedule regular meetings with community groups to keep them informed of the entity's progress in meeting goals. Water managers should look to genuinely involve, not just inform the public. Enlisting the public, including key stakeholder

groups, in the implementation effort will increase its chances of success.

The plan should also address whether, when, and how the water utility or district intends to involve members of the community in the monitoring and evaluation of the selected conservation measures and programs. Public participation in monitoring and evaluating water conservation activities provides system managers with valuable information on implementation challenges and success factors. This allows revisions to conservation activities to increase their effectiveness.

Monitoring and Evaluation

Colorado's water conservation planning statute requires a covered entity to include the steps the entity will use to monitor and review the conservation plan. A monitoring and evaluation plan should address data collection, modeling, and other activities that will be important in tracking the effects of water conservation on demand over time. The entity may want to plan to collect new kinds of data for monitoring purposes as well as for future forecasting needs. Many entities might find, for example, that more detailed data on demand by customer class are needed, including more detail on contributions to average-day and maximum-day demands. More detailed data might also be needed to assess trends in non-account water. Data collection efforts should also address the costs of water conservation. Entities should track implementation costs, for each measure/program or interrelated group of measures/programs. Coupled with water savings data, this will allow calculation of actual costs per gallon or acre-foot of water saved. This information will be very valuable in evaluating and selecting conservation measures and programs when it is time to revise the plan.

Did you know?

For covered entities, the Office of Water Conservation and Drought Planning will need to review and approve the final Water Conservation Plan before it can be formally adopted.

Plan Updates and Revisions

A plan and schedule for updates and revisions will help keep the entity's conservation plan current over time and account for the entity's actual experience with conservation. Updating forecasts of water demand and supply capacity as new data become available is especially important. In some cases, the entity might want to revise or expand its planning goals. Many entities update plans every five years. Under Colorado's water conservation planning statute, a

covered entity must include the steps the entity will use to revise the plan, and the time period, not to exceed seven years, after which the entity will review and update its plans. However, changing conditions or other concerns might justify more frequent updates. Finally, the conservation plan also should include a record of the plan's adoption by the water system's governing body (such as a Board of Directors or City Council), as appropriate.

NEXUS WITH STATUTORY REQUIREMENTS OF §37-60-126

Information compiled through the completion of Planning Step 8 **will assist** your adherence to the following requirements of §37-60-126:

- Consideration of water-saving measures and programs;
- Developing an understanding of the role of water conservation plans in meeting overall water supply planning goals;
- Estimating the amount of water that may be saved through implementation of the water conservation plan (as well as water that has been saved by previously implementing water conservation activities); and
- Deciding upon the steps that you will use to implement, monitor, review, and revise the water conservation plan.
- Engaging the public in a process of plan review and comment.

This planning step **is required** to fulfill:

- §37-60-126 (4c) which relates to deciding upon the steps that you will use to implement, monitor, review, and revise the water conservation plan activities;
- §37-60-126 (4d) which relates to developing an understanding of the role of water conservation plans in meeting overall water supply planning goals.
- §37-60-126 (4e) which relates to establishing a time period of not greater than seven years for plan review and updating;
- §37-60-126 (5) which relates to engaging the public in a process of plan review and comment.

STEP 9 - MONITOR, EVALUATE, AND REVISE CONSERVATION ACTIVITIES AND THE CONSERVATION PLAN

Goal of Planning Step 9

Implement the Plan

This planning step involves the implementation of the adopted water conservation plan. Implementation can be as varied as the planning process itself, since ultimately the water utility or district has the authority to develop, adopt, make publicly available, and implement a plan based on its own unique needs and limitations. However, adherence to the processes presented in this guidance document has direct benefits to the water manager, since a substantial body of work in water conservation shows that well-designed and conscientiously implemented conservation measures and programs provide significant benefits to the planning entity and its customers.

To that point, meaningful water conservation relies on the combined effects of:

- ✓ Appropriate goal setting;
- ✓ Sound selection and use of available measures and programs;
- ✓ Involved public and community groups; and
- ✓ Regular and deliberate monitoring of customer behavior, water use patterns and water system performance over time.

Coordinating these activities in a continuous, adaptive process helps the water manager better understand the complex dynamics associated with his or her water supply system and the water demand characteristics it must serve. Knowing that water supply and demand management is an ever-evolving set of processes, the smart water manager will continuously adapt the water conservation program to meet changing needs and conditions. That is the essence of effective water conservation plan implementation.