



The Voice of the Colorado Water Conservation Community

November 30, 2010

Veva Deheza, Section Chief
Office of Water Conservation and Drought Planning
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

**RE: Final Report for Colorado WaterWise Best Management Practices Development Project
Grant Routing #09PDA00053/Encumbrance #C154131**

Dear Ms. Deheza:

Colorado WaterWise is pleased to announce the successful completion of the Best Management Practices Development Project. All key deliverables have been successfully executed. Included with this report is our final grant invoice.

With this project, Colorado WaterWise has become a proven conservation leader. Colorado WaterWise worked with various groups to develop a comprehensive Colorado-specific best practices guidebook; build a new and robust website, and transform its quarterly newsletter. The products and tools developed through this grant will be of benefit to water providers throughout Colorado for many years to come.

Below you'll find a list of accomplishments for each task.

Task 1 - Develop Comprehensive Statewide Water Conservation BMPs – 100% Complete

The scope of work for Task 1 included five subtasks.

Subtasks	Accomplishments
1. Form a Project Advisory Committee; Finalize Contract with Sub-Contractors; Develop a Workplan	Completed September 2009 Formed a 15-member Project Advisory Committee and a 35-member Stakeholder Advisory Committee. Contracted with Peter Mayer, Aquacraft Inc., to author the Guidebooks, and with Brenda O'Brien to be project manager. Developed a Best Practices project workplan to ensure the project remained on task and within budget.
2. Conduct Best Practices Literature Review	Completed October 2009 Aquacraft completed a Best Practices Literature Review that was distributed to the Project Advisory Committee for further discussion and feedback.
3. Select best management practices for inclusion in the guide.	Completed November 2009 Produced a matrix of potential Best Practices from the Literature Review. Members of the Project Advisory and Stakeholder Advisory

Subtasks	Accomplishments
	Committees selected 14 Best Practices for inclusion in the Guide (attached).
4. Prepare a draft of guidance document.	Completed April 2010 Developed a draft of the Technical Guide. This task was the most significant and time consuming of the project.
5. Conduct technical reviews.	Completed October 2010 Completed technical reviews for the literature review, Best Practice selection process, each Best Practice, and the Technical and Summary Guidebooks.

Task 2 – Outreach Efforts – 100% Complete

The scope of work for Task 2 included four subtasks.

Subtasks	Accomplishments
1. Deliver three technical workshops across Colorado; two along the Front Range and one on the Western Slope.	Completed November 2010 Conducted three workshops to introduce the Best Practices Guidebooks and to offer instruction on how the Best Practices can be utilized when developing State-required water conservation plans. Workshops were held in: Pueblo, Sept. 30; Glenwood Springs, Oct. 14; and Westminster, October 21.
2. Produce hard-copy Technical and Summary Guides.	Completed October 2010 <u>Technical Guides:</u> 182 copies were printed and distributed as follows: <ul style="list-style-type: none"> - 82 to CWCB's Covered Entities; - 25 to CWCB; - 27 to Colorado WaterWise Board members and key stakeholders; - 48 remaining to Colorado WaterWise CWCB approved Colorado WaterWise to sell the remaining manuals for \$50. <u>Summary Guides:</u> 300 copies were printed and delivered to CWCB for statewide marketing. Both Guides may be downloaded free from Colorado WaterWise's website.
3. Deliver one signature event per year for membership value.	Completed April 2009 and September 2010 Conducted two events; an inaugural event on April 5-6, 2009 themed <i>Conservation Yardstick</i> . A second event on Sept. 24, 2010, themed <i>From the Mountain Top to the City Tap: Using Tools and Policy to Make Every Drop Count</i> .

Subtasks	Accomplishments
4. Represent Colorado WaterWise at metro-area events; out of state events upon direction from Colorado WaterWise Board.	Completed 2008 through 2010 Colorado WaterWise provides outreach on an ongoing basis. To increase visibility and membership, Colorado WaterWise overhauled its website to make it more robust, user-friendly and informative. Colorado WaterWise reaches out to new partners to convey information, solidify its branding and financially collaborate on projects.

Task 3 – Organizational Support – 100% Complete

The scope of work for Task 3 included eight subtasks.

Subtasks	Accomplishments
<ol style="list-style-type: none"> 1. Provide support to Colorado WaterWise’s Board of Directors and Management Team; support all communication and correspondence. 2. Arrange monthly Board meetings and prepare agendas. 3. Attend Board meetings, record and distribute minutes. 4. Support Colorado WaterWise sub-committees. 5. Provide maintenance updates for website. 6. Provide support to membership database. 7. Support financial reporting. 8. Support and conduct grant administration duties. 	<p>Completed November 2010</p> <p>Contracted with Brenda O’Brien as its Project Coordinator to oversee the Best Practices project, and to aid in fulfilling many of Colorado WaterWise’s administrative needs. Brenda provided ongoing organizational support so that the Board of Directors could focus on Board business and long-term strategic planning. Colorado WaterWise’s strategic goals are:</p> <ul style="list-style-type: none"> - Serve as the primary urban water conservation technical resource for professionals in Colorado. - Promote urban water conservation to professionals throughout Colorado. - Ensure Colorado WaterWise’s organizational sustainability and growth. - Participate in the development of urban water conservation policies and integrated resources planning. <p>The Project Coordinator, Management Team and Board of Directors maintain regular contact to ensure all key deliverables are met and within budget.</p>

Conclusion

In conclusion, the Colorado WaterWise Board of Directors is pleased and very grateful for all the outcomes, both large and small, that were made possible through this Water Efficiency Grant award. The most noticeable tools and products were the *Best Practices Guidebook for Water Conservation in Colorado*, two conservation-oriented Annual Events, a new and robust website, and an informative quarterly publication. Aside from the tangible product deliverables are the less tangible outcomes that Colorado WaterWise is most proud of. Notably, Colorado WaterWise strived to further its brand as a recognized “conservation player” and now has a seat

at the table. Colorado WaterWise established many new partnerships with organizations who share similar goals. Colorado WaterWise plans to work collaboratively on projects in support of a common cause, to share the financial burden and realize the conservation benefits. In the days and years to come, Colorado WaterWise will continue its grassroots conservation efforts and work tirelessly as the "Voice of Colorado's Conservation Community."

We hope that you are proud of what we accomplished and comfortable in knowing that your funds were put to good use. Colorado WaterWise would like to thank the Colorado Water Conservation Board's Board of Directors for giving us this grant opportunity, and to the Office of Conservation and Drought Planning's staff for supporting us throughout this challenging project. Our work has built what our peers have wanted, what they needed, and what they will use for years to come.

We look forward to meeting with you on Wednesday, December 15, 2010 at 10:00 a.m. to personally hand deliver our final grant report.

Respectfully submitted,

A handwritten signature in dark ink, reading "Brenda O'Brien", is displayed on a light gray rectangular background.

Brenda O'Brien
Colorado WaterWise
Project Coordinator

A handwritten signature in black ink, reading "Peter Mayer", is displayed on a white background.

Peter Mayer
Aquacraft, Inc., Senior Project Engineer
Best Practices Author

Cc: Colorado WaterWise Board of Directors

Attached: Matrix of Best Practices included in the Guidebook

Water System and Utility Best Practices

No.	Best Practice	Category	Overview	Estimated Water Savings
1	Metering, conservation-oriented rates and tap fees, customer categorization within billing system	Foundational, Informational, Support, Management. Impacts utility operations and all customers directly.	Impacts the way utilities charge new customers when they join the system, bill their existing customers for the water they use, and understand who customers are and which customers might benefit from improved water efficiency. This category can also include advanced metering systems that provide leak detection and real time use data for customers.	<ul style="list-style-type: none"> • Metering: 10 – 40% reduction vs. un-metered. • Rate structure: Varies by structure and rates. Reduction range = 0 – 30%. • Tap fees: Varies by method. Efficient buildings have been shown to use 30-70% less water. Linking tap fees to demands will encourage conservation. • Customer categorization: None.
2	Integrated resources planning, goal setting, and demand monitoring	Foundational. Impacts utility operations and customers indirectly.	Integrated resources planning (IRP) is a comprehensive planning effort that incorporates water conservation programs as another option for meeting future needs. IRP encompasses least-cost analyses of demand and supply options that compares supply-side and demand-side measures on a level playing field and results in a water supply plan that keeps costs as low as possible while still meeting all essential planning objectives.	A plan by itself doesn't save water. A utility without a conservation plan doesn't save water either.
3	System water loss control	Foundational. Impacts utility operations only.	Water loss control is the practice of system auditing, loss tracking, infrastructure maintenance, leak detection and leak repair for water utilities. Leak detection and repair are familiar water agency practices, but true water loss control is more pragmatic than simply finding and fixing leaks. Auditing a water distribution system for real and apparent losses and evaluating the costs of those losses is the foundation of water loss control. Cost and benefit considerations drive implementation actions in the recommended methodology, described in detail in the American Water Works Association M36 Manual (2009).	Water savings from water loss management programs depend entirely on the ongoing level of loss. It should be the goal of all water providers to limit real and apparent losses to economically efficient levels.

No.	Best Practice	Category	Overview	Estimated Water Savings
4	Conservation coordinator	Foundational, Informational, Support, Management. Impacts utility operations and potentially all customers directly.	A conservation coordinator is critical for every utility aiming to reduce water demand. A “go to” person for water conservation is essential to the successful implementation and management of water conservation programs. For large water utilities, the job of water conservation coordinator is a full time job. Small utilities may not have sufficient resources to have a dedicated conservation coordinator. Small agencies should select a staff member who has other primary assignments to be the designated conservation coordinator – the person responsible for planning and implementing water conservation efforts. Staff should be given education or training in conservation as well as authority to affect change.	A conservation coordinator alone doesn't save water, but a coordinator (or someone filling that role) is essential to successful plan and program implementation.
5	Water waste ordinance	Foundational, Operations. Impacts customers directly.	A water waste ordinance is a local regulation that explicitly prohibits the waste of water and clarifies enforcement and penalties. Waste includes things such as irrigation runoff, irrigation that occurs on a prohibited day and/or time, leaks, use of inefficient fixtures and appliances, or use of wasteful commercial or industrial processes (e.g. poorly controlled cooling towers).	Savings depend upon publicity and enforcement – much like traffic laws. Having an ordinance provides a legal basis for enforcement and drought management. It also aids in peak demand management.
6	Public information and education	Foundational, Education, Support. Impacts customers directly.	Public information and education encompasses social marketing, school education, public outreach and education, and other information efforts aimed at raising awareness and fostering a culture of conservation and behavior change. An element of public information and education is required in nearly all other best practices in this guidebook. Central components of this best practice include effectively communicating the value of water, and delivering consistent and persistent messages. This best practice also includes measures to provide customers with timely information on their water consumption and alerts if unusual usage or leakage is detected.	Utilities should not rely on any water savings from a public outreach campaign alone. Conservation outreach programs help establish a culture of wise water stewardship which over time results in behavior change and effective action such as replacing inefficient fixtures and appliances. Successful conservation marketing efforts increase participation levels in other utility sponsored programs such as landscape audits or rebates.

Outdoor Landscape and Irrigation Best Practices

No.	Best Practice	Category	Overview	Estimated Water Savings
7	Landscape water budgets, information, and customer feedback	Foundational, Programmatic, Understanding, Informational, Support, and Control. Impacts all customers depending upon implementation.	Landscape water budgets address landscape water use and encourage efficiency. Comparing actual metered consumption against the legitimate outdoor water needs of the customer based on landscape area, plant materials, and climate conditions. The customer is provided powerful information about the irrigation practices and efficiency at the property.	Varies. Many landscapes are already irrigated at an efficient level and for customers who use less that efficiency levels, budgets have the potential to increase consumption. Efficient irrigation practices have the capability of reducing landscape water by up to 35% in some cases. Water budgets, particularly when linked with an increasing block rate structure, can lead to significant reductions in water use. After implementing budget-based rates, Centennial Water and Sanitation District reported a 25% reduction in demand.
8	Rules and regulations for landscape design and installation and certification of landscape professionals	Programmatic and Control. Impacts all new customers and those who use professionals to re-develop existing landscapes.	This best practice supports sustainable and water efficient landscaping design, installation, and maintenance practices. Creating rules for new landscape and irrigation system design and installation is a relatively inexpensive way to affect landscape water use. Proper installation and maintenance are needed to create and maintain water-efficient irrigation. A second powerful tool is minimum training requirements and certification for landscape irrigation professionals. These requirements can function in concert as trained and certified professionals are in the best position to design, install, and maintain water efficient landscapes and irrigation systems that meet mandated standards. Adopting existing certification programs can help create consistent benchmarks for landscape contractors working in multiple service areas. Utilities may lack authority to promulgate these rules and regulations and may need to work with state and local government to enact.	A 2002 study in Colorado Springs compared water use between a traditional landscape and two landscapes developed using the principles of Xeriscape. The study found water savings ranging from 22% to 63% after implementing the rules and regulations set forth in the 1998 Colorado Springs Landscape Code and Design Manual. Typical savings from landscape regulations range from 15 - 35%. Contractor certification has unmeasured water saving benefits.

No.	Best Practice	Category	Overview	Estimated Water Savings
9	Water efficient design, installation, and maintenance practices for new and existing landscapes	Programmatic and Support. Impacts new and existing customers who install new landscaping.	Design, installation, and maintenance of landscapes and irrigation systems can greatly impact water use. This best practice maximizes water efficiency through water budgeting and the proper design, installation, and maintenance of new and existing landscapes and irrigation systems. This BP is largely based on the work of the Green Industries of Colorado (GreenCO) as published in their 2008 BMP guide (GreenCO 2008). Utilities may lack authority to promulgate some rules and regulations and may need to work with state and local government to enact.	Applies to new and existing landscapes. Savings potential of a landscape designed, installed, and maintained for water efficiency vs. standard can be a 35% reduction in annual irrigation use or more according to GreenCO. Designing the landscape to meet a water budget target can establish a savings level. Many landscapes are already irrigated at an efficient level. Proper ongoing maintenance helps preserve water efficiency of the original design.
10	Irrigation efficiency evaluations	Foundational, Programmatic, Understanding, Informational, and Support. Impacts participating customers.	The efficiency of an irrigation system can greatly impact the amount of water that is used in the landscape. Over time, even a well designed and properly installed irrigation system becomes less efficient unless it is well maintained and operated for maximum efficiency. This best practice describes key considerations for maximizing water efficiency through the use of regular irrigation efficiency evaluations.	If recommendations are implemented, savings can range from 5 - 40%. Savings depend upon the severity of problems at each site, the level of over-irrigation prior to the evaluation, and implementation of recommendations.

Indoor Residential Best Practices¹

No.	Best Practice	Category	Overview	Estimated Water Savings
11a	Rules for new construction	Programmatic and Control. Impacts new residential construction.	Water conservation measures that are “built in” to new buildings can help slow the growth of new water demands. This best practice describes water efficiency specifications that some water utilities can make voluntary or mandatory for new residential development within their service areas. Utilities may lack authority to promulgate these rules and regulations and may need to work with state and local government to enact.	High efficiency homes are expected to use approximately 15 - 30% less indoors than standard new homes. Similar reductions are expected for multi-family properties.
2a	High-efficiency fixture and appliance replacement for residential sector	Programmatic, Support, and Control. Incentive program impacts participants only. Retrofit on reconnect impacts anyone transacting real estate.	The goal of this best practice is to increase the installation rate of water efficient fixtures and appliances and to remove inefficient and wasteful devices from the service area in favor of efficient products. Various means are used to spur customers into replacing products. In some programs, customers are simply given hardware that is more water efficient. Faucet and showerhead replacement programs often take this tact. Rebates and vouchers are also important tools for coaxing customers to replace devices with more water efficient models. A low cost alternative is a requirement for retrofit on reconnect where fixtures and appliances must be upgraded as a condition for re-joining the water system after a real estate transaction.	HET vs. 3.5 gpf toilet = saves approx. 8,000 - 20,000 gallons per household per year. HET vs. 1.6 ULF = approx. 1,500 gallons per year. HE CW vs. standard top loader = saves approx. 5,000 - 20,000 gallons per household per year. 1 gpm faucets vs. 2.2 gpm faucets saves 2,000 - 10,000 gallons per household per year. 2.0 gpm showerhead vs. 2.5 gpm showerhead saves approximately 0 - 5,000 gallons per household per year.
13	Residential water surveys and evaluations, targeted at high demand customers	Programmatic and Support. Impacts participants only.	Water surveys and evaluations (frequently referred to as “audits”) that identify water savings opportunities and educate customers are a fundamental component of residential water conservation programs. Although often offered to all customers, high volume customers should be targeted first to maximize water savings and minimize program expenses.	Surveys by themselves don't save water, but they often spur savings. Consider impacts to wastewater flow too. Eliminating inefficient water uses should be able to reduce annual consumption by 10 – 20% <i>after implementing the recommendations</i> of a carefully conducted site audit.

¹ Applies to both single-family (SF) and multi-family (MF) residences.

Indoor Non-Residential Best Practices

No.	Best Practice	Category	Overview	Estimated Water Savings
11b	Rules for new construction	Programmatic and Control. Impacts new non-residential construction.	Water conservation measures that are “built in” to new buildings can help slow the growth of new water demands. This best practice describes water efficiency specifications that some water utilities can make voluntary or mandatory for new non-residential developments within their service areas. Utilities may lack authority to promulgate these rules and regulations and may need to work with state and local government to enact.	High efficiency non-residential (commercial, industrial and institutional) buildings are expected to use approximately 15 - 25% less indoors than standard buildings.
12b	High-efficiency fixture and appliance replacement for non-residential sector	Programmatic and Support. Incentive program impacts participants only. Retrofit on reconnect impacts anyone transacting real estate.	The goal of this best practice is to increase the installation rate of water efficient fixtures and appliances and to remove inefficient and wasteful devices from the service area in favor of efficient products. Various means are used to spur customers into replacing products. In some programs, customers are simply given hardware that is more water efficient. For the commercial sector more generalized incentives may be appropriate as fixtures and equipment vary from site to site. A low cost alternative is a requirement for retrofit on reconnect where fixtures and appliances must be upgraded as a condition for re-joining the water system after a real estate transaction, including sale or lease.	The savings that can be achieved in the non-residential sector through the replacement of domestic fixtures and through specialized equipment (described in more detail in Best Practice 14) are substantial, but less definitively quantified because of the variability inherent in non-residential demand. The <i>Watersmart Guidebook – A Water Use Efficiency Plan Review Guide for New Businesses</i> offers reasonable estimates of water savings that can be achieved in a wide variety of non-residential settings.
14	Specialized non-residential surveys, audits, and equipment efficiency improvements	Programmatic and Support. Impacts participants only.	Specialized non-residential surveys and equipment efficiency improvements reduce water demands in the commercial, institutional and industrial (CII) sector. This best practice specifically <i>excludes</i> toilets, showers, and faucets (i.e. fixtures found in residential and non-residential accounts); however part of the survey process involves identifying all domestic fixtures that should be upgraded to improve efficiency.	The range of savings will vary greatly and depend entirely on the measures implemented at the site. As part of the 2000 AWWA Commercial and Institutional End Uses of Water study it was estimated that many non-residential sites have the potential to conserve between 15 and 50% of their current demand (Dziegielewski et. al. 2000).