School Education
BMP Implementation Guidebook

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Introduction

In December 2008, the California Urban Water Conservation Council (CUWCC) updated the Best Management Practices (BMPs) required under the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU)[1], incorporating a broader approach to achieving water savings, improving water use efficiency, and measuring progress.

As a Foundational Best Management Practice (BMP), School Education is an essential water conservation activity for all water utilities and is adopted for implementation by all signatories to the Memorandum of Understanding as an ongoing practice.

Sustainable water use is crucial for social and economic stability as well as for a healthy environment. This challenge is even more important as climate change and population growth affect the amount of water available to competing interests.

Education is a fundamental element for promoting wise water use among customers. School education programs can provide young people with a deeper understanding of complex environmental issues and equip them to contribute to solutions.

Water conservation education can encourage a lifelong understanding and commitment to responsible use of water. When school-aged children are provided with knowledge, they can become the champions and leaders in water conservation.

The three main benefits of school education programs are:

- children develop good water use habits at an early age;
- children are likely to take the information learned home to influence their families to conserve water; and
- children leave a lasting impression on society and improve water use behavior in the next generation.

[1] The Memorandum of Understanding and Best Management Practices, as amended December 10, 2008, are available in the Resource Center at www.cuwcc.org.

Coverage Requirements

First Requirement: Tie into Content Standards

All school districts must ensure that their curriculum meets California Content Standards (http://www.cde.ca.gov/be/st/ss). **Educators will be much more likely to teach water conservation if the materials help them cover required content.** The standards often suggest a sequence for presenting content, moving from simple concepts with younger children to more complex presentations of the same ideas with older children. Content also may follow a set sequence within grade levels. School districts can use a variety of materials to meet the content standards, and many teachers supplement with other materials. As long as the standards are taught at some point in the year, teachers usually have some flexibility.

How to confirm materials meet the state education framework requirements and are grade-level appropriate

- The content standard should be stated in the materials. Look for lesson plans developed by credentialed teachers who are familiar with the content standards. When presentations are contracted out, presenters should be experts in teaching water conservation and water science. They should understand and teach to the content standards. In addition, ensure that the material developed is not too dated. Content standards can change, and it's important to have up-to-date curriculum. Review curriculum content regularly, at least every two to three years.

How to find curriculum that meets the standards

- Many agencies, both large and small, use an "education in a box" approach with materials developed by experts such as Project WET (http://www.projectwet.org/) and Water Education Foundation (http://www.watereducation.org/). For those with a small education budget, this approach may make the most financial sense. There are many other resources for curriculum, including:
    - Department of Water Resources (DWR) Education Committee: This is an ad hoc group of people involved in water education that meets to share ideas and resources. Getting involved is one of the best ways to find out what other water agencies are doing to meet their School Education BMP and find resources that can be adapted locally. Contact Michelle Robinson at DWR's Water Education unit.
    - Education and Environment Initiative (EEI) (Curriculum http://www.calepa.ca.gov/Education/EEI/default.htm/): The EEI Curriculum is a State Board of Education approved curriculum that teaches select Science and History/Social Science academic content standards in grades K-12 to mastery using the environment as a context for learning. Many of the curriculum units address water issues. The lessons are available online, free of charge. CalEPA is

working with local school districts and a wide range of partners to implement the EEI Curriculum statewide.

- California Environmental Education Community Network (http://www.creec.org/): The California Department of Education operates this program, which is coordinated locally through County Offices of Education. CREEC maintains a database of environmental education resources, including lesson plans on water conservation. Contact a local CREEC coordinator or the Science Resource Coordinator at the local County Office of Education.
- Metropolitan Water District (http://www.mwdh2o.com/): Some wholesalers, such as Metropolitan Water District, conduct periodic meetings on water education and can provide lesson plans and other guidance. Any agency can participate in the MWD education meetings. Many other water suppliers offer educational resources. See the 'Resources' section for more ideas.
- California Department of Education's Environmental Education Resources (http://www.cde.ca.gov/pd/ca/sc/oeeintrod.asp): This website lists curriculum resources and grant programs.

When an agency should develop its own curriculum

With all of the resources available today, it seldom is necessary to develop custom curriculum. However, it is very important to tailor existing materials to the needs of local teachers. Build close relationships with local schools to find out what teachers need and will use (see Establishing Partnerships below).

Pegging non-classroom activities to content standards: Many agencies, teachers, and facilities work together to customize tours, gardens, and projects to meet current lessons and the associated standards. For examples, see these case studies and links:

American River Water Education Center (ARWEC), Otay Water District Demonstration Garden (See case-study-Otay_garden) and Discovery Science Center (http://www.discoverycube.org/education).

Second Requirement: Distribute materials to K-6 students and, when possible, also to grades 7-12

Although many water agencies hire teachers or send other employees into classrooms, there are other effective ways to distribute age-appropriate classroom materials on water conservation. Project Wet training can be offered to teachers (See project_wet_SWEP document) and/or support teachers' efforts with lesson plans, equipment loans, and supplies (See casestudy_classroom_demos_HVLCSD.pdf). Third-party providers offer turnkey assembly and classroom programs for a fixed cost per student (casestudy_runningtoilet_ACWD_document). Poster and calendar contests offer opportunities to reach out to students and their families:

- "case_study_lakearrowhead_calendar"
- "SanJuan-PosterContest"
- "case_study_san_juan_calendar"

How to discover what programs teachers will use

It's best to assess needs and requirements before designing a program. Call the superintendant's office and ask if one must follow a specific process to have a program approved. Then, with the district's permission, ask local educators what they already teach about water conservation and what enrichment programs they would welcome. Contact science and lead teachers, principals, and district-level staff who manage curriculum. Regional coordinators for the California Regional Environmental Education Community (CREEC Network) and the CalServe Service Learning Initiative, usually based in the County Office of Education, may know local educators who are active in environmental education. Also ask neighboring water agencies which of their programs have been popular with teachers.

When to "push" programs out to schools or rely on teachers to request support

Proactive contact is essential to promote new programs. Once established, programs often grow to capacity through returning participants, word of mouth, and annual publicity. Nurture relationships with every teacher, district policy maker, and school administrator that show interest. They will become champions and allies for the programs.

Getting started: Explain the program to a school's principal through a letter or phone call before contacting teachers. This is a good idea even if the district doesn't require it. Pilot new programs with a small group of educators. Seek their feedback and tweak programs annually to incorporate suggestions. If a program isn't growing, evaluate why and either change it or discontinue it. Once a program is successful with a core group of teachers, expand to more schools or grade levels.

Publicity

School office staff usually will distribute flyers, letters, and newsletters to teacher mailboxes. Follow their procedures, listen to their advice, and show appreciation for their help. Here are some examples of brochures and water use efficiency follow-up information:

- "VallejoWaterBrochure"
- "Water in Your Classroom 09-10"
- "Water in Your Classroom order form 09-10"

- Many teachers prefer to be contacted by e-mail because they can respond at a time that's convenient for them. Check school web sites for teacher e-mail addresses.
- Contact new participants during the fall to schedule presentations for the upcoming academic year (avoid the first two weeks when teachers are especially busy). Contact past

participants in the spring to schedule presentations for the next school year, then reconfirm several weeks before the scheduled visit.

- Take advantage of newsletters and websites that teachers read, such as those published by the CREEC Network and your County Office of Education.

Tracking success

Determine objective criteria for measuring results as part of an education plan. East Bay Municipal Utility District (EBMUD) has a great example: EBMUD-SchoolPlan. Then design simple ways to obtain and document the required data, such as the following:.

- Use pre- and post-assessments to document the level of knowledge gained through the program.
- Provide a feedback form (and stamped return envelope if necessary) for each classroom presentation to evaluate presenter effectiveness and tally the number of students reached. Or use an online survey tool such as Survey Monkey and e-mail each teacher a link to the evaluation.
- Look for assembly programs that ask students to answer questionnaires throughout the presentation and turn in at the end or as part of follow-up enrichment activities.

- For home conservation audits, have families report participation and results. Agencies have used business reply postcards ("ACWD Leak detect postcard 02") or worksheets and stamped envelopes. They may ask families to report results on the agency's web site. Consider providing a reward to boost participation (see for example, the Orange County Water Hero campaign http://www.ocwaterhero.com/). The LivingWise and WaterWise programs offered by Resource Action Programs include follow-up reports for the agency (below).

- Any time teachers are asked to return evaluation and reporting forms, make it quick and simple. And a small thank-you gift (a $5 coffee gift card, for example) would be greatly appreciated! The Alameda County Water District provides $50 to classrooms participating: "Post-assembly lesson plan"!

How to Start a School Education Program

This section suggests a step-by-step roadmap for agencies that are starting a School Education Program. Again, EBMUD has a great example: "EBMUD-SchoolPlan".

1. Identify the K-12 schools in your service area. Locate public school districts and private schools in the Yellow Pages or online and then visit their websites.

2. Identify the number of children in each grade level. Phone the school and ask for grade populations (this will give you an idea as to how many items, booklets, brochures that you may need).

3. Research the school district's process for reviewing and approving supplemental curriculum and assess teachers' needs.

4. Determine your budget; it will dictate the number of students and/or grade levels you will be able to reach.

5. Call your wholesaler, neighboring water agencies, and other utlities, looking for partnerships, curriculum, training, and grants.

6. Explore grant funding through government and private sources.

7. Choose your best options based on budget and time available. Write an Education Plan ("EBMUD-SchoolPlan") that includes goals, key messages, measurable objectives, tactics, budget, and ways to measure results.

8. Execute your plan. For BMP reporting and future budgets, document the number of presentations or other activities, dates, students reached, grade levels reached, schools and teachers reached, and all expenses.

9. Evaluate and plan for next year.

Establishing Partnerships

Partnerships can be a valuable asset and can help offset costs associated with a school education program. Through partnerships, agencies can share expertise, planning, staffing, printing and designing of materials, writing and editing text content, and the cost of getting the word out. For example, West Basin and Central Basin Municipal Water Districts developed "Conservation Connections," a curriculum for analyzing water and energy use in the home (find the workbook here: "StudentBook", and find the teachers' guide here: "TeacherGuide").

When considering a partnership, it is imperative to identify the goals that agencies have in common, as well as the benefits each agency will receive from partnering, and how that will work toward accomplishing their individual goals. Another benefit of partnerships, especially regionally, is economies of scale. Regionally, a group of agencies or partners can order or print more materials at a lower rate per item, reducing the total expense for materials.

Partnering with a wholesaler also can simplify reporting for retailers. BMP 2.2 specifies that, when mutually agreeable and beneficial, the wholesale agency or another lead regional agency

can operate all or part of the education program. If the wholesale agency operates all or part of the retail agency's school education program, then it may, by mutual consent with the retail agency, assume responsibility for CUWCC reporting of this BMP. Under this arrangement, a wholesale agency may aggregate all or portions of the reporting and coverage requirements of the retail agencies joining into the mutual consent.

Other water agencies, wholesalers, and regional organizations are common potential partners, but also look to other organizations and businesses. Energy utilities have a growing interest in water education due to the links between water and energy conservation. California American Water partnered with Southern California Edison and Southern California Gas to significantly reduce the cost of offering the turnkey program LivingWise ("casestudy LivingWise CalAm"). Entities that teach how to reduce source point pollution in stormwater also are likely partners for water conservation education, linking irrigation run-off as a potential pollutant in waterways. Local businesses, community groups, and environmental organizations are all potential partners.

1. Wholesale/retail partnerships

a) The Metropolitan Water District of Southern California also has a wholesale-assistance program for public education and outreach: http://www.mwdh2o.com/mwdh2o/pages/education/h2o/h2o.html

b) San Diego County Water Authority offers a similar program to its retail agencies: http://www.sdcwa.org/teachers

2. Regional partnerships

a. Sacramento Regional Water Authority (RWA) is a joint powers authority that serves and represents the interests of 21 water providers in the greater Sacramento, Placer, El Dorado and Yolo County region. The Authority's primary mission is to help its members protect and enhance the reliability, availability, affordability and quality of water resources. They leverage economies of scale to support school education programs throughout the four counties. RWA also participates in a theater assembly program and the Radio Disney Kidcaster program in the Sacramento region. "Smart Rebates Program Update".

b. A group of water agencies in Southern California formed the Water Education Water Awareness Committee (WEWAC) to promote the efficient use of water and to increase public awareness of the importance of water. They can be contacted at: http://www.usewaterwisely.com/index.cfm.

3. Investor-owned utilities

Investor-owned water utilities (private water suppliers) may plan school education programs and other water conservation efforts at a corporate level. Water conservation coordinators in branch offices should first determine what corporate programs and materials are available ("casestudy LivingWise CalAm"). It still is important to understand the needs of

local educators to customize programs when possible. It also can be beneficial to collaborate with other local water agencies to take advantage of economies of scale and to simplify coordination with school districts. When more than one utility serves a school district, district officials will appreciate a unified approach to water education.

Planning the Budget

What are typical budgets for small, medium, and large agencies?

CUWCC members reported a wide range of annual budgets for school education programs for 2007 and 2008. The average (mean) varied considerably by who sponsored the programs:

- Wholesalers: $54,743
- Mixed retail and wholesale sponsorship: $16,291
- Retailers: $20,781

The charts below summarize data reported by CUWCC agencies for 2007 and 2008, including the average (mean) numbers of students served in school education programs, costs, and the percentages of agencies using two popular methods—teacher workshops and class presentations. Data for wholesale-sponsored programs includes all sizes of wholesalers, since their population data was not reported. For programs with mixed (retail and wholesale) sponsorship and retail-only sponsorship, averages are shown by agency size: small (less than 20,000 customers), medium (20,000 – 200,000 customers), and large (more than 200,000 customers).

Analysis of BMP 8 data reported for 2007 and 2008

Wholesale Sponsored Programs

Average # Students Reached	Average Budget	Average Cost per Student	Percent Using This Method: Teacher Workshops	Percent Using This Method: Class Presentations
23,316	$137,799	$40	66.7%	91.7%

Wholesale and Retail Sponsored Programs (mixed)*

Average # Students Reached	Average Budget	Average Cost per Student	Percent Using This Method*: Teacher Workshops	Percent Using This Method*: Class Presentations
23,226	$69,230	$5	100.0%	100.0%
3,811	$11,154	$9	38.5%	92.3%
222	$153	$1	0.0%	100.0%

Retail Sponsored Programs*

Average # Students Reached	Average Budget	Average Cost per Student	Percent Using This Method*: Teacher Workshops	Percent Using This Method*: Class Presentations
11,242	$94,046	$19	55.6%	88.9%
1,233	$14,426	$23	20.0%	66.7%
330	$2,492	$16	5.3%	47.4%

Reporting Unit Sizes

Wholesale customer base	Population not reported
Large*	More than 200,000 customers
Medium*	20,000 – 200,000 customers
Small *	Less than 20,000 customers

*Includes only agencies that reported population

"Model" programs that are most cost-effective for small, medium, and large agencies

School Education Program data reported for 2007-2008 is not detailed enough to identify statistically representative "models" for agencies of various sizes. However, the data presented above do provide evidence that partnerships between wholesale and retail agencies have the widest reach for the amount invested per student.

- Wholesale sponsored education programs have more budgets to work with and reach more students. They typically cost more per student.
- Wholesale/retail sponsored (mixed) programs reach more students than retail-only sponsored programs. However, mixed programs cost much less per student on average than retail-only programs.
- As would be expected, smaller reporting units typically have the smallest budgets, reach the fewest number of students, and spend the least per student. However, the data suggests that small agencies spend 16 times more working when working independently.

Determining how many students or schools should be approached:

BMP 2.2 does not require agencies to serve a specific percentage of students. Agencies interviewed for this guidebook set goals for their programs in different ways. Some strive to reach all students in specific grade levels. For example, they select grade levels where the content standards fit well with key water conservation messages. Other agencies set goals based on the historical growth of their programs, seeking to reach more students each year as budgets permit. Others contact all of their schools each year and serve as many as students as they can on a first-come, first-served basis. Budget is always a factor.

How to justify funding a school education program to a board of directors:

Agencies interviewed for the guidebook said their boards make school education programs a priority for all of these reasons:

- Children are water consumers and the next generation of rate-payers. Educating them about the scarcity of water as a resource and the role of essential infrastructure helps agencies meet state mandates to reduce per capita water consumption and build a valuable positive identity in the community.
- Teachers are opinion leaders and educational programs create tremendous goodwill in local communities.
- Data from studies such as the 2009 ACWA survey (*Californians and Water Conservation: Key Findings from Focus Groups and a Statewide Survey,* March 2009) show that kids make the best teachers. Parents listen to their children and are influenced by them.

Resources

Classroom presentations:

Managing a classroom presentation programs can be a challenging task for any water agency of any size. Dublin San Ramon Water Services District has had that experience recently, and wrote a case study on their "lessons learned": "DSRD-classroom-admin"

- Small agencies can conduct classroom education programs, too! See this case study from the Hidden Valley Lake Community Services District: "casestudy_classroom_demos_HVLCSD.pdf".
- The US Bureau of Reclamation offers lesson plans for a variety of classroom levels: www.usbr.gov/mp/watershare/resources/lessonplans.html.
- Conservation Connection: A curriculum developed by West Basin and Central Basin Municipal Water Districts: find the workbook here: "StudentBook", and find the teachers' guide here: "TeacherGuide".
- Discovery Science Center (http://www.discoverycube.org/education) is the largest provider of water education programs in Southern California. Each year, approximately 110,000 students participate in their school-based water programs. Depending on location, schools may be eligible to sign up at no cost. Each program includes a Discovery Science Center instructor, free materials for students and aligns with California Science Content Standards. This program is used by Irvine Ranch Water District.
- The US Environmental Protection Agency also offers lesson plans for all age levels (http://www.epa.gov/safewater/kids/index.html) and teacher resources to compliment the materials (http://www.epa.gov/students/teachers.html#epawater).
- Getwise.org is a website sponsored by Resource Actions Programs, a family of community conservation programs designed to increase residential resource efficiency and community awareness: http://www.getwise.org and http://www.resourceactionprograms.org/.

Large group assemblies

- ZunZun (http://zunzuntunes.com/intro.php) is a service that organizes classroom and larger school assemblies on the theme of water conservation and resource use. The Alameda County Water District makes use of this organization: "casestudy_runningtoilet_ACWD".
- Discovery Science Center, mentioned above, also does school visits: http://staging.discoverycube.org/oc/cube-at-your-school/

- EarthCapades describes their events as "environmental vaudeville." More information is available on their website: http://www.earthcapades.com/. This service is used by Eastern Municipal Water District.
- Shows that Teach (http://www.showsthatteach.com/)
- Rock Steady Juggling (http://www.rocksteadyjuggling.com)

Children's water festivals or other events:

For more information on the considerations necessary in holding a successful event, please see the Public Information Guidebook.

- The Folsom office of the US Bureau of Reclamation holds an event every year called the "Get W.E.T. Event." "casestudy_event_get-wet" This event is targeted at young children and brings together many of the water agencies, environmental groups, and other commercial entities in the region to put on what has become an annual occasion.

The CA Department of Water Resources joins in the fun at the 2010 Get W.E.T. Event.

Water is magic at the Get W.E.T event!

- The Orange County Water District has held the Children's Water Education Festival for several years, now. It is a huge event that takes many months and many participants to plan: "case-study-OCWD-Water-Ed-Festival".

Cooperative efforts with existing science/water education programs:

- For those students interested in water-related science projects, Eastern Municipal Water District provides a Science Fair Handbook for grades K-12. The handbook guides the student from the initial choosing of a water-related topic, to providing a general timeline for productivity, to portraying a finished science fair display. More information is available here: http://www.emwd.org/education/science-projects.

Other methods of disseminating information:

- Online: When budget cuts suspended its classroom education program, Dublin San Ramon Services District posted its lesson plans online and encouraged teachers to borrow equipment and supplies: http://www.dsrsd.com/outreach/classroom-programs-about-water.
- Order forms distributed to schools:
- "Water in Your Classroom 09-10"

- "Water in Your Classroom order form 09-10"

Water conservation contests such as poster and photo:

Outreach doesn't have to consist of big, expensive events. Contests, by their very nature, often grab students' attention and will do part of the job of marketing. While an agency may want to reproduce the "winners" of contests, this effort is likely to be substantially less expensive than many other types of outreach.

Poster and essay contest examples:

- San Juan Water District: "SanJuan-PosterContest"
- Alameda County Water District: "School pocket folder 09-10"
- Helix Water District holds an annual photo contest: "case_study_helix_photo_contest." The forms necessary for holding this photo contest are also available:
    - Letter to educators: "Letter to educators 2010-2011"
    - Flyer: "Flyer - Photo Contest 2010-2011"
    - Release form: "Image Release Form 2010-2011"
        - Eastern Municipal Water District
            - Poster contest: http://www.emwd.org/education/annual-contests/poster-contest
            - Write-off contest: http://www.emwd.org/education/annual-contests/write-off-contest
        - San Diego County Water Authority essay contest: http://www.sdcwa.org/be-watersm%E2%80%9Cart%E2%80%9D-essay-contest

Calendar contest examples:

- San Juan Water District: "case_study_san_juan_calendar"
- Lake Arrowhead Water District: LINK to "case_study_lakearrowhead_calendar" document

Teacher training workshops:

- Solano County Education Program: "project_wet_SWEP"
- Eastern Municipal Water District in-service training: http://www.emwd.org/education/teachers/resources-for-educators/teacher-in-service-training-tours

Fund and/or staff student field trips:

- American River Water Education Center "ARWEC"
- Otay Water District Garden Tour: "case-study-Otay_garden"

- Water-wise gardening workshop for teachers, San Diego County Water Authority: http://www.sdcwa.org/teacher-workshops

Careers:

- Elsinore Valley Municipal Water District: http://www.evmwd.com/depts/admin/public_affairs/education/default.asp#CAREER
- Dublin San Ramon Services District: http://www.dsrsd.com/employment/careertraining.html

Federal, State, and private grant funding:

- Environmental Protection Agency grants for environmental education in California: http://www.epa.gov/region09/enviroed/index.html. All federal grants are summarized on a searchable database www.grants.gov.
- California Department of Education searchable database of grants: http://www.cde.ca.gov/fg.
- California Department of Water Resources grants page: http://www.grantsloans.water.ca.gov/
- California Coastal Commission WHALE TAIL® Grants Program: http://www.coastal.ca.gov/publiced/plate/plgrant.html]
- California State Parks Land and Water Conservation Fund: http://www.parks.ca.gov/?page_id=21360
- Grant summary websites such as Conservationgrants.com: http://www.conservationgrants.com/water.htm
- Private sector programs such as Raley's Reach http://www.raleys.com/cfapps/reach/reach.cfm. Check with companies based in your region.
- Non-profit organizations such as the National Gardening Association: http://www.kidsgardening.com/

Agency-sponsored Grant programs:

- Elsinore Valley Municipal Water District http://www.evmwd.com/depts/admin/public_affairs/education/default.asp#GRANTS
- Western Municipal Water District: Educator grants: http://www.wmwd.com/index.aspx?nid=149
- Inland Empire Utilities Agency: Garden in Every School grant program: http://www.ieua.org/education/gies.html
- Metropolitan Water District: Community Partnering Program http://www.mwdh2o.com/mwdh2o/pages/yourwater/cpp/cpp.html provides

sponsorships for water-related projects, events and activities. CPP's primary focus is currently on water conservation programs and activities.