

Conservation Connection

2008 Regional Director's Award for Water Conservation



Pictured: Dennis Perkins, Water Conservation Specialist in the Northern California Area Office and Sue King, District Manager of Orland-Artois Water District.

Acting Regional Director Mike Finnegan, presented the Regional Director's Award for Water Conservation to Orland-Artois Water District at the 2008 Mid-Pacific Region Water Users Conference held in Reno, Nevada.

Orland-Artois Water District, formed in 1954, irrigates 29,000 acres of land and has been an active participant in the Mid-Pacific Region's Water Conservation Program since the program's inception in 1996.

With a staff of four, the District serves as one of the larger districts on the Tehama Colusa Canal in the Sacramento Valley. Orland-Artois has maintained a current water conservation plan with timely annual updates and continues to modernize and implement water conservation projects through the following activities:

- fully piped and measures diversions at all turnouts,

- implemented four phases of Supervisory Control and Data Acquisition (SCADA), providing automation and monitoring throughout the entire District,
- utilized a meter scanning and data automation program,
- scheduled several years of on-farm mobile irrigation lab evaluations,
- developed a District wide competitive program for on-farm irrigation efficiency improvements,
- sponsored several District to Farmer in-the-field education programs,
- developing a GIS database demonstration with CSU Chico,
- strived to lead research & development programs for new water technology.

Even with all of the above achievements, the District continues to seek new and innovative methods to improve water management and conservation.

The Regional Director's Award recognizes the Directors, the District Manager, Ms. Sue King, and the staff of Orland Artois Water District, for their impressive activities and leadership that reflect their proactive approach to water conservation.

Air Injection Tried in Organic Trials

By Steve Olson
California Agricultural Technology Institute

Scientists with the Center for Irrigation Technology at California State University, Fresno, are
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Graduate student Namratha Reddy (left) and Dr. Dave Goorahoo (right).



The Mid-Pacific Region Welcomes a New Member to the Water Conservation Team



The Mid-Pacific Region welcomes Anna Sutton as the newest member of the Water Conservation Team. Anna will be reviewing water conservation plans, administering grants, and updating Best Management Practice criteria. She is currently overseeing the 2008 CALFED Water Use Efficiency Grant Program.

Anna comes to us from the Army Corps of Engineers where she worked for six years in the Wetland Regulatory Program in Salt Lake City, UT and Sacramento, CA. While with the Corps, she spent 6 months supervising reconstruction projects in Iraq and one month providing emergency relief to the residents of New Orleans, LA immediately after Hurricanes Katrina and Rita.

Anna received her B.S. in Animal Science and M.S. in Resource Management from Cal Poly, Pomona. For her thesis, she spent a summer sampling flora, fauna, and soils in the Mojave Desert for the Bureau of Land Management's Off-Highway Vehicle program. Prior to college, she served five years in the Marines, stationed at Camp Pendleton.

Calendar of Events:

Irrigation System Evaluation Class
Irrigation Training and Research Center on June 16-18.
Cal Poly, San Luis Obispo, CA
For more information call 805-756-2434 or www.itrc.org.

Chico State Irrigation Training Facility
Landscape Irrigation Audit Workshop, in Redding, CA on June 3-4.
Landscape Irrigation Audit Workshop, in Chico, CA on June 5.
For more information call 530-898-4554 or www.csuchicoag.org/scada/Workshops/

CALFED Water Use Efficiency Grant Technical Workshops
There will be three workshops to review the grant process and answer questions. The workshops will be conducted in April and May in Sacramento (April 30), Fresno (May 1), and Los Angeles (April 29). Times and locations are available on the WaterShare website at www.usbr.gov/mp/watershare/index.html.

California Bay-Delta Tour
June 4-6
Water Education Foundation
For more information call 916-444-4240 or www.water-ed.org/tours.asp.



Flowers Wild and Native

By Marsha Prillwitz

While it is unlikely that we can regain the grandeur of Central Valley as the “continuous bed of honeybloom” marveled at by John Muir one hundred years ago, we can recapture a small slice of our horticultural heritage by cultivating wild and native plants in our gardens. These plants provide flowering beauty with very little water and even less fuss on the gardener’s part. Don’t expect your wildflower patch to be as “neat and tidy” as a formal garden bed. These plants are WILD, remember? The advantages of their wild nature are many. Once established, wildflowers re-seed themselves, and seldom require watering, pruning, or fertilizing. In addition, birds, butterflies, beneficial insects, and other wildlife are attracted to their beauty and fragrance.



Coral Bells (*Heuchera maxima*)

The best time to sow wildflower seeds in the Sacramento region is between September and December. Fall rains will germinate the seeds. Seedlings will grow two to three inches

before the coldest weather sets in and by spring, the plants will be ready to spurt in size and burst into bloom. If you can’t wait until next fall, spring is the next best time to plant.



Cleveland Sage (*Salvia* 'Allen Chickering')

Pick a spot in your landscape to plant your wildflowers. Or, if you have a very small growing space, consider planting some wildflower seeds in a large container. Wildflowers are not too particular about soil conditions. As with most plants, they prefer good drainage. A light cultivation of the soil and a very thorough weeding of the site will get you off to a good start. Broadcast the seeds over a weeded and cultivated area. For small seeds, mix one part seed with four parts sand or vermiculite for a more even coverage. After spreading the seeds, rake the bed gently, and then press the seeds firmly into the soil. If it is a small area, instead of raking, cover the seeds with a thin layer of potting soil or compost and then solidly pat down the area. A light watering of the wildflower bed will help with seed germination. Occasional watering during the late spring and early summer will lengthen the bloom of some wildflowers. It is not necessary to fertilize wildflowers.

There are three major plant communities in our region: grassland, riparian, and oak woodland. Five native plants from these communities that can be easily incorporated into a standard garden are wild lilac, manzanita, coral bells, California fuchsia, and Cleveland sage. Do not locate these plants next to ones that require a lot of water.

The distinguishing features of the various forms of wild lilac (*Ceanothus*), from groundcover to tall shrub, are their glossy evergreen leaves and blue to violet flower clusters. At the Friends to UC Davis Arboretum Plant Faire, you can find several *Ceanothus* including 'Dark Star', 'Frosty Blue', and 'Ray Hartman'.

The manzanita (*Arctostaphylos*) is less dramatic in bloom with small, white to pale pink flowers, but their purplish-red bark and glossy leaves are attractive all year long. Birds love the manzanita.



Dark Star (*Ceanothus*)

Coral bells (*Heuchera maxima*) do well in shady places. Clumps of round, scallop-edged leaves form the base for stalks with tiny pink to red bell-shaped flowers. This is a favorite of hummingbirds.

A native groundcover is the California fuchsia (*Zauschneria*), also known as the hummingbird flower. The low growing foliage often dies back in the winter. (Continued on page 5)

(Air Injection Tried in Organic Trials from Page 1)

expanding their research in the use of air injection as a means of enhancing soil properties for crops.

Agronomist Dr. Dave Goorahoo began exploring the technique, now referred to as AirJection® Irrigation, several years ago using newly patented technology to inject air into subsurface drip irrigation lines. The system uses high-efficiency venturi injectors to mix microscopic bubbles of air with the water inside the drip line. The air permeates the soil along with the water during irrigation and helps to aerate the soil.

“Recent and ongoing research has shown that AirJection® Irrigation can increase root zone aeration and add value to grower investments in subsurface drip irrigation systems,” Dr. Goorahoo said.



Graduate student Namratha Reddy

“So far we have tested the technology on conventionally grown bell peppers, fresh market tomatoes, cantaloupes, honeydews, broccoli, and sweet corn.”

In the summer of 2004, a study on a 20-acre cantaloupe plot revealed a 13-percent increase in the number of melons harvested and an 18-percent increase in the weight of melons in plots treated with AirJection® Irrigation, Goorahoo noted.

The work conducted to date has been aimed at evaluating AirJection® Irrigation using conventional farming methods. In a new phase of research, Dr. Goorahoo is overseeing a graduate student project assessing the impact of nitrogen on the yield and quality of bell peppers grown organically using the AirJection® Irrigation.

Handling the technical aspects of the project is Namratha Reddy, a master’s degree candidate in the Department of Plant Science. As part of her work, Reddy has overseen the fertilizer and irrigation applications. She also attends the field regularly to measure plant photosynthesis, transpiration rates, and soil respiration.

The study is being conducted on Fresno State’s University Farm. The experiment features a split plot design comprised of eight beds, each five feet wide and 50 feet long, representing four replications of air injected treatments, and no-air (control) treatments. Nitrogen is being applied at rates of 30, 60, 90, and 120 lbs/acre as commercially available organic fertilizer (12-0-0) derived from feather meal.

Initial measurements through August revealed that both AirJection® Irrigation and the amount of nitrogen had a significant effect on plant transpiration rate, Reddy reported. Nitrogen application rates also had a significant effect on stomatal conductance and water use efficiency.

Soil samples taken before and after the cropping season will be used to assess the impact of AirJection® Irrigation on soil fertility. Yield data, tissue analysis, and plant biomass data also will be determined. “The increase in yield and improvement in soil quality associated with the root zone aeration augers works well for the adoption of AirJection® Irrigation, primarily as tool for increasing crop productivity,” noted Dr. Goorahoo.

Results of yield analyses and other aspects of the project will be presented at upcoming seminars and in special publications. For more information, Dr. Goorahoo may be contacted via email at dgooraho@csufresno.edu.



(Flowers Wild and Native from Page 3)

Cleveland sage (*Salvia* 'Allen Chickering') grows to four feet tall, with pale purple, "shish-ka-bob" flowers. It needs infrequent, deep watering twice a month during the summer and full sun.



California fuchsia (*Zauschneria*)

According to the California Native Plant Society (CNPS), there are 6,000 native plants to California, over 2,000 that occur nowhere else in the world. The CNPS is a non-profit organization dedicated to the understanding and appreciation of California's native plants and how to conserve them and their natural habitats through education, science, advocacy, horticulture and land stewardship.

There are 32 CNPS local chapters throughout the state. To find the chapter in your area, visit www.cnps.org/cnps/chapters/list. There are many other demonstration gardens located throughout California. The Native Plant Demonstration Garden located in Sacramento, at the Historic City Cemetery, has a large assortment of native plants and wildflowers on display and offer tours and workshops throughout the year. The American River Water Education Center in Folsom has gardens that display native, low water use plants. The McConnell Arboretum & Gardens in Turtle Bay offers insight about plants with thoughtful emphasis on making selections in harmony with the climate. These include plants that are drought tolerant, grow in heavy soils, and tolerate cool, wet winters.

Wildflowers and native plants make a great addition to any garden or landscape. Plant some today and enjoy their beauty for years to come while at the same time conserving water.

About the Author – Marsha is the former Chief of the California Department of Water Resources' Office of Water Use Efficiency. Marsha also spent four years as a Water Conservation Specialist for USBR. She has been a University of California Master Gardener for 28 years. She authored two books, [Growing Vegetables California Style](#) and [Growing Dinner](#).

Chico State Agricultural Technology and Research Center Propeller Meter Repair

By Dennis Perkins

On February 7, Chico State invited the Northern California area Water Districts to participate in a Propeller Meter Repair Workshop. The course was led by Steve Huth of TechnoFlo Systems. The class was at full capacity with 24 field men participating. These are the same individuals responsible for meter maintenance in Northern California Water Districts.

The class covered the maintenance and repair of a variety of different types of propeller meters which are used in the Northern California area. Instruction was also provided on conversion of mechanical meters to digital meters. Digital meters are capable of providing flow and totalizing data to automation and monitoring systems such as Supervisory Control and Data Acquisition (SCADA) systems.

The workshop was a great success. Participant feedback was very positive.

The Chico State Agricultural Technology and Research Center program provides technical assistance to Northern California Water Districts. There are courses scheduled throughout the year on topics such as SCADA, pump efficiency, flow measurement methods, water meter maintenance, drip irrigation, and canal flow and level control methods. These courses are a part of a joint effort with Cal Poly Irrigation Training and Research Center and Fresno State University. The classes are funded with Water Conservation Program Technology Transfer Grants from the Bureau of Reclamation, Mid-Pacific Region's Water Conservation Program.



U.S. Department of the Interior
Bureau of Reclamation

Grant Opportunities Available!

Reclamation's Mid-Pacific Region announces two funding opportunities for water use efficiency projects and water conservation technology transfer.

2008 CALFED Water Use Efficiency Grant Program - A Request for Applications (RFA) for the CALFED Water Use Efficiency Grant Program is currently posted on www.grants.gov.

Reclamation has approximately **\$1.5 million** available to agricultural and urban entities for the encouragement of water use efficiency and conservation activities that benefit the California Bay-Delta. Reclamation can fund up to 50% of approved projects, not to exceed \$300,000. Reclamation is accepting applications through **June 2, 2008**, 3:00 pm PST.

The objective of the CALFED Water Use Efficiency Grant Program is to accelerate the implementation of cost-effective actions that provide statewide benefits through water conservation. Water use efficiency can reduce the demand for Bay-Delta water and can result in significant benefits to water quality, water supply reliability, and in stream flows.

Reclamation is currently administering 26 grant agreements with water purveyors throughout the State of California under the CALFED Water Use Efficiency Grant Program. In FY 2006, Reclamation signed 15 agreements (8 agricultural and 7 urban), awarding \$2.9 million. In FY 2007, another 11 agreements were signed (5 agricultural and 6 urban) for an additional \$1.6 million. With local cost-shared contributions, Reclamation's CALFED Water Use Efficiency Grant Program has resulted in over a \$12.3 million investment into water use efficiency projects statewide. It is estimated that these projects will conserve or better manage approximately 136,000 acre-feet of water annually.

The RFA, application information, and all required forms and worksheets are available on the WaterShare website at www.usbr.gov/mp/watershare/index.html or contact your Area Office Water Conservation Specialist.

2008 Water Conservation Program Technology Transfer Grant - The Mid-Pacific Region of Reclamation will soon be releasing a RFA for educational institutions to transfer water conservation technology to the general public, delivery system modernization assistance, and advice to agriculture water districts. Reclamation anticipates that approximately \$600,000 of funding will be available.

The objective of the Water Conservation Program Technology Transfer Grants is to foster improved water conservation and management by providing state of the art technology, technical assistance, and expert modernization advice to water districts that receive water from the Central Valley Project.

Past Water Conservation Technology Grant recipients include California Polytechnic State University's Irrigation Training and Research Center and Chico State's College of Agriculture Teaching and Research Center. These grants funded several short research studies, district rapid appraisals, canal demonstration facilities, technical assistance, and the development of new water management technologies.

The full program announcement, application information, and due dates will be available soon on the WaterShare website at www.usbr.gov/mp/watershare/index.html or contact your Area office Water Conservation Specialist.



Just For Fun....



- The five Great Lakes form the largest fresh surface water system in the world. If all the water in the Great Lakes was spread evenly across the continental US, the ground would be covered with almost 10 feet of water, (<http://www.clwa.org/conservation/tips.cfm>).
- Lake Tahoe is the second deepest lake in the U.S. has a maximum depth of 1,645 feet. The lake holds 40 trillion gallons of water. That is enough water to cover the state of California to a depth of 14 inches, (<http://www.clwa.org/conservation/tips.cfm>).

- The Mississippi River is about 2,340 miles long, but its largest tributary, Missouri River, is 2,540 miles long. The longest river in the world is the Nile River which is 4,160 miles in length, (*Largest Rivers in the United States*, US Geological Survey Fact Sheet, Open File Report 87-242).

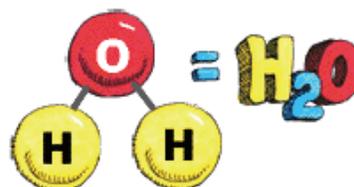


- The Egyptians were the first people to record methods for treating water. These records date back more than 1,500 years to 400 A.D. They indicate that the most common ways of cleaning water were by boiling it over a fire, heating it in the sun, or by dipping a heated piece of iron into it. Filtering boiling water through sand and gravel and then allowing it to cool was another common treatment method, (www.seminolecountyfl.gov/envservs/watercon).

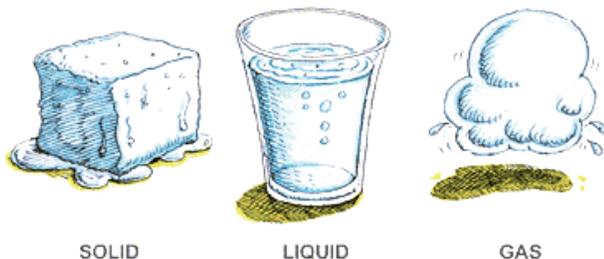


The **water cycle** or **hydrologic cycle** is a continuous process where water evaporates, travels into the air and becomes part of a cloud, falls down to earth as precipitation, and then evaporates again. This repeats again and again in a never-ending cycle. Water keeps moving and changing from a solid to a liquid to a gas, over and over again, (www.epa.gov/kids/water).

Everything is made of **atoms**. An atom is the smallest particle of an element, like oxygen or hydrogen. Atoms join together to form **molecules**. A water molecule has three atoms: two hydrogen (H) atoms and one oxygen (O) atom. That's why water is sometimes referred to as H₂O. A single drop of water contains billions of water molecules, (www.epa.gov/kids/water).



Pure water is tasteless, odorless, and colorless. Water can occur in three states: **solid** (ice), **liquid**, or **gas** (vapor).



SOLID

LIQUID

GAS

Solid water - ice is frozen water. Water freezes at 0° Celsius, 32° Fahrenheit.

Liquid water is wet and fluid. This is the form of water with which we are most familiar. We use liquid water in many ways, including washing and drinking.

Gas - The process which solids (sublimation) and liquids (evaporation) turn into water vapor and enter the atmosphere.



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