



# Overcoming Drought, Part II: *Trends in Greenhouse Irrigation*

Slowly but surely, growers are recognizing not only the need but also the benefits of reclaiming their irrigation water.

**W**ater is becoming a very precious, and increasingly scarce, commodity — both in and outside the horticultural community. The view of water as cheap and plentiful has slowly begun to change — just ask growers in California, the Mid-Atlantic, South Florida or the Rocky Mountains, where local and state governments are instituting strict water conservation and reuse practices.

## THE WATER RUNNETH OUT

Less than four-tenths of one percent of the world's fresh water is usable for human consumption, according to Tom Kimmell, executive director of the U.S. Irrigation Association. And as the American population grows, so does the demand for fresh, potable water. Since the beginning of this century, per capita water use in the United States has quadrupled, with Americans typically consuming between 60 and 100 gallons of water per capita per day.

To help reduce the demand on fresh water supplies, the idea of using reclaimed water is gaining momentum. Cities like Tucson, Ariz.; San Diego and Pasadena, Calif.; Austin, Texas; and Tampa and St. Petersburg, Fla., are using reclamation systems to conserve water and reduce heavy reliance on water sources from outside their regions.

Reclaimed water is the product of a wastewater treatment process that eliminates harmful by-products while retaining beneficial elements. Depending on the type of reclamation system used, the treated water can be "cleaned" to meet safety standards for drinking water or simply treated for secondary uses such as landscape irrigation or for decorative fountains and pools.

Faced with dwindling water supplies, growers have not only tapped into their local reclaimed water services, they have started water reclamation systems of their own.

"We were one of the first growers to install a water reclamation system in our area," said Doug Mahlstedt, manager of Rudvalis Orchids, Carlsbad, Calif. "It just made fiscal and environmental sense."

## HOW THE WATER WORKS

There are several types of reclamation systems on the market, but each uses the basic principle of filtering out harmful contaminants to allow reuse of the water. In a typical system, water runoff is channeled after irrigation and collect-

## By Beth Meneghini

ed in a holding area such as a pool, pond or settling tank. Water is then transferred into a separate area to be "cleaned." Most systems use a series of carbon, charcoal or sand filters to separate large particles and dirt from the water. Water is then passed through stronger filters that kill bacteria, viruses and other pathogens. These final stages often use UV, infrared, chlorine or ozone filters.

Rudvalis' water reclamation system, from Pure O3 Tech, Escondido, Calif., utilizes ultraviolet radiation, ozone and a configuration of pumps and filters. The system removes bacteria and pathogens and recovers 50-80 percent of fertilizers for reuse. Mahlstedt reports a savings in the amount of water the facility uses, as well as a reduction in fertilizer and nitrate costs.

"Our system takes water samples and measures the amount of nitrates still contained in the recycled water. That way we only inject the fertilizer we need without adding extras," said Mahlstedt.

At this point, Rudvalis is using the reclaimed water to irrigate landscape plants around the grounds, although Mahlstedt said he wouldn't hesitate to use the water to irrigate the facility's orchid crops.

"Right now, the reclaimed water doesn't re-enter our crop irrigation system, but we will eventually pipe it back into the system. It is on our list of projects for the year," he said.

Vista, Calif.-based Altman Plants, which grows a variety of annual and herbaceous perennials and was the 2002 GPN/MasterTag Marketing Innovation Award winner, also utilizes a Pure O3 Tech water reclamation system. Once the Altman system processes the water through the filtration system, it is blended with fresh water before use.

"It's approximately a 50/50 blend of reclaimed water and city water," said John Ryan, a grower for Altman's. "We pump the blended water right back into our irrigation system and use it on all of our crops."

"I was a bit skeptical of using the reclaimed water to irrigate our crops," added Ryan, "especially on sensitive plants like poinsettias and small cuttings. But 12 million gallons have been processed through the system since installation last December, and we haven't had a single problem."

## RUNOFF CAN BREAK THE LAW

Despite inconsistent enforcement, the Federal Clean Water Act spells out the standards for all discharges off commercial property. Finalized in 1987, the Act created a federal-state partnership in which the federal government

set the agenda and standards for pollution abatement, while states were to carry out day-to-day implementation and enforcement. The Act has two major parts. The first states that all discharges (water and otherwise) into the nation's waters are unlawful, unless specifically authorized by a permit. The second part provides for financial assistance for water quality improvement projects.

Despite the provisions for enforcement, most states didn't have the time or money to play watchdog to greenhouses and nurseries. But all that seems to have changed. As suburban sprawl moves in on greenhouse operations and state agencies have begun more frequent monitoring of creeks, streams and rivers, greenhouses are in increasing danger of being cited for contaminated water runoff.

"The immediate benefit of a reclamation system is the cost savings on water and fertilizer," said Ryan. "But the greater benefit is that the system ensures we are in compliance with state and federal environmental laws. No one wants to be pumping chemicals into the environment and endangering our clean waterways. The reclamation system demonstrates Altman's philosophy of enterprise in harmony with the environment."

In addition to the EPA, the Department of Health and the USDA, local and regional environmental groups are popping up throughout coastal communities in California, Florida and other states to keep greenhouse growers in check.

"The California Urban Water Conservation Council (CUWCC) and the Fallbrook Conservation Service are just two groups that have started policing the industry for water runoff," said Jim Brazie, agricultural sales manager for Hydroscape Products, a California-based developer of irrigation uniformity and efficiency systems. "But this certainly isn't just a Southern California issue. Growers all over the country will be facing this, if they aren't already."

"As housing developments move closer to greenhouse operations, citizens are also starting to notice and report water runoff from any business near their homes," said Mahlstedt.

### BUDGET CONSTRAINTS

So if a water reclamation system can save growers money on water and fertilizer bills, as well as prevent costly citations, why don't all growers have such systems?

"The easy answer is cost," said Mahlstedt. "The initial cash outlay is quite high, and most growers sim-

ply don't have that much cash lying around for a whole new system."

According to Can Sirin, Pure O3 Tech, a water reclamation system can cost between \$100,000 and \$300,000. But Sirin is quick to point out that the cost of a system pales in comparison to the potential fine for violating runoff regulations.

"It seems expensive, but the cost savings in water and fertilizer is almost immediate, and you completely eliminate the potential of an EPA fine," said Sirin.

And while the Clean Water Act imposes water runoff regulations, it also stipulates funding for growers willing to install systems. ♦

## industry issues



Altman's received a \$50,000 grant from the Environmental Quality Incentives Program (EQIP), the main conservation program of the federal Farm Bill, to help cover the costs of its water reclamation system.

Another potential pitfall with reclaimed water is increased salt content. Salinity will increase with each irrigation cycle and can cause leaf burn in susceptible plants.

"Salt content is a concern," said Mahlstedt. "But the solution is relatively simple. It takes a bit of forethought, but if you pass the reclaimed water through a reverse osmosis system, it will keep your salinity in check."

### CONSERVATION AT A LOWER PRICE

Manufacturers and growers alike agree that as time passes, water reclamation systems will become less expensive, making them affordable to more greenhouse and nursery operations.

"As purification systems are perfected, more will get installed," said Brazie, "and the cost will be reduced. There are currently only a few companies offering these products and services. But, the whole system will be streamlined and more affordable in the near future."

In the meantime, growers can perform a number of tasks to save money, water and the environment. "Before you even build a water catch facility or reclamation system, it is absolutely necessary to back up your current irrigation system and tighten things up," said Brazie.

Brazie recommends checking irrigation application and system uniformity. "Target systems for 85 percent uniformity. Also check irrigation scheduling and employ the 'cycle and soak, technique.'"

For example, if a crop needs 10 minutes of watering time per day, run the irrigation system in three, three-minute cycles instead of one 10-minute cycle, advised Brazie. "You'll get less runoff with a cycle and soak and won't waste so much water. Even if you don't install an entire water recycling system, every little bit helps." GPN



*Top: Storage tanks such as these are necessary for recirculating irrigation water as well as filtering and cleaning it; Bottom: By recirculating irrigation water, you can often save the time and expense needed to remix fertilizer before each watering.*

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