

Slash your Water Use by 50% or More

Insights from four cannabis operations practicing or planning water reclamation.

Jolene Hansen

Environmental emergencies in media headlines are harsh reminders of the impact that drought and water issues have on the cannabis industry. But limited supplies aren't the only water issues on growers' minds. As profit margins shrink and regulators zero in on water waste and use, interest in **water reclamation**—the process of capturing and recycling wastewater for other uses—is growing.

Cannabis Business Times spoke with four cannabis operations practicing or planning water reclamation for insights on their processes and lessons learned.



Garden Remedies captures reclaimed water, in the form of condensate, into tanks, then runs it through a reverse osmosis system. Photo provided by Garden Remedies.

Brent Townsley, General Manager, Harvest Foundation, Albuquerque, N.M.

At Harvest Foundation, a 12,000-square-foot indoor cultivation facility in north downtown Albuquerque, General Manager Brent Townsley doesn't take the grow's water use lightly. "Water is precious anywhere, but especially here in the desert," Townsley says.

Since its 2016 launch in a remodeled warehouse, the company has reduced water use and waste by collecting condensate from its air conditioning and dehumidification units. Reclaimed water now accounts for one-half to two-thirds of Harvest Foundation's water use, with the balance pulled from the municipal water supply.

HOW MUCH WATER ARE OPERATORS CONSERVING THROUGH RECLAMATION?

Harvest Foundation: 50% to 66%

Garden Remedies: 85%

Clade⁹: an estimated 80%

Zen Group: 80%

— *Cannabis Business Times*

Growth and equipment purchases have occurred in waves over the past two years at Harvest Foundation, but Townsley had always planned for reclamation. "When we started the remodel [of the warehouse], I ran Zurn PEX Cross Linked poly tubing into a lot of the access panels and ball-vented it off so we could always have access to it. We had the piping in place from day one," he explains.

The grow utilizes 100 tons of cooling on the building. (One ton of cooling is roughly equivalent to 12,000 btu/hour). Six Quest 205 dehumidifiers are joined by three Quest 506 units. The only additional equipment required for water reclamation and reuse has been 300-gallon holding tanks. Reclaimed water is pulled from the tanks using the same type of submersible pump Harvest Foundation uses for nutrient tanks.

Harvest Foundation's municipal water undergoes reverse osmosis, but reclaimed water does not. "Our water to begin with is high on the alkalinity side. So, we'll pH down, and we've found we need to add [calcium and magnesium], but it's fairly cost-effective to do that and stay in the conservation areas that we want to try to maintain," Townsley says. Tanks are cleaned regularly to protect against any microorganism or bacterial issues.

Regular testing has alleviated most of Townsley's concerns regarding heavy metal contamination from equipment coils. "We've done testing on it, and we feel we're not suffering any quality in our final product. We're pretty confident with the quality of water we are feeding with," he says.

Townsley advises facilities implementing condensate reclamation to keep filters clean. "We change our filters every three to four weeks max. Keep everything as clean and simple as possible," he says. "We try to make sure we give our patients the best, cleanest product possible."

Bob Hasche, Director of Facilities, Garden Remedies, Fitchburg, Mass.

For Massachusetts-based Garden Remedies, New England's cold winters presented wastewater-disposal problems. Faced with a potential exterior ice problem from water created by the normal operation of HVAC units, the company decided to pipe the water to tanks and its reverse osmosis systems instead of directing it down city drains.

Director of Facilities Bob Hasche, who joined Garden Remedies soon after that decision, continues to work to limit the operation's wastewater and overall water use.

Now in Phase II of a planned 80,000-square-foot indoor grow, Garden Remedies' grow rooms total about 17,000 square feet. All water passes through a custom-built reverse osmosis system. "That's fed out to the grow rooms, then our environmental systems re-condense humidity from transpiration and feed it back into the RO system," Hasche explains.

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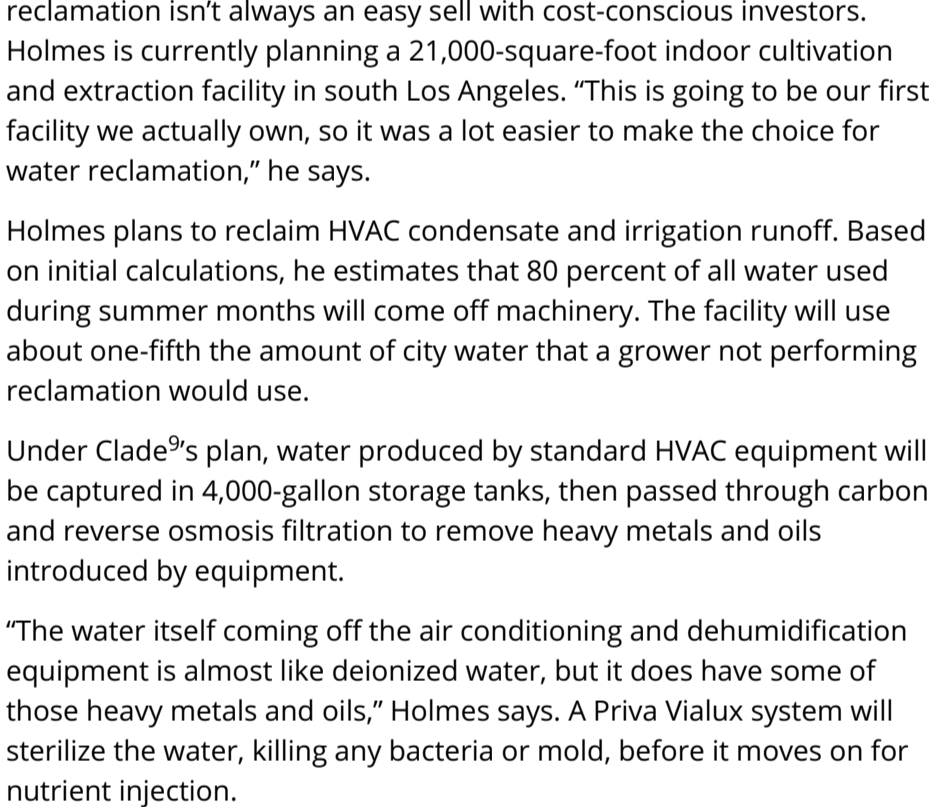
For every 500 gallons of water used, the system reclaims roughly 425 gallons of condensate. The remaining 75 gallons comes from the municipal water supply.

However, storage capacity has limited reclamation at the cultivation facility. "To take full advantage of reclaiming this water, you have to have the capacity to hold it. That's a lot of tankage," Hasche says. With expanded production, Garden Remedies' existing tanks can't store all the condensate produced, but additional tanks are planned.

The grow's other reclamation-specific additions are a gravity-fed piping system (a piping system that uses gravity to return condensate to tanks) and a large pump system to pull it from the tanks. Garden Remedies uses copper piping, which Hasche feels reduces risks of microbial organisms that would grow in plastic. "I recommend disconnecting the piping once a year to clean it and sanitize it. Otherwise, it runs itself," he says.

Reduced water bills aren't a major motivator for the grow. "Our [city] water is not very expensive. The important thing is being environmentally sound," Hasche says. "We also test our water frequently. The condensate is extremely pure compared to the city water. It has no chlorine and almost no dissolved metals that RO would have to remove from city water. It's much easier for the reverse osmosis machine to do what it needs to do."

While Hasche hasn't been pressured by regulatory agencies, he says people are talking about the industry's energy and water use. "I advise all facilities directors and managers to look at their facility now and start getting plans on the table to reduce their consumption of power, gas and water," he says. "The writing's on the wall."



Zen Group uses automated reclaimed condensate systems in the facilities the company builds and manages. Photo courtesy of Zen Group.

David Holmes, Founder and CEO, Clade⁹, Los Angeles, Calif.

Clade⁹ CEO David Holmes strives to be as green as possible, but water reclamation isn't always an easy sell with cost-conscious investors. Holmes is currently planning a 21,000-square-foot indoor cultivation and extraction facility in south Los Angeles. "This is going to be our first facility we actually own, so it was a lot easier to make the choice for water reclamation," he says.

Holmes plans to reclaim HVAC condensate and irrigation runoff. Based on initial calculations, he estimates that 80 percent of all water used during summer months will come off machinery. The facility will use about one-fifth the amount of city water that a grower not performing reclamation would use.

Under Clade⁹'s plan, water produced by standard HVAC equipment will be captured in 4,000-gallon storage tanks, then passed through carbon and reverse osmosis filtration to remove heavy metals and oils introduced by equipment.

"The water itself coming off the air conditioning and dehumidification equipment is almost like deionized water, but it does have some of those heavy metals and oils," Holmes says. A Priva Vialux system will sterilize the water, killing any bacteria or mold, before it moves on for nutrient injection.

Irrigation is calculated to reduce nutrient and water waste upfront. Runoff will be collected in a dedicated tank, sterilized through the Priva Vialux, then reused. Reinjecting nutrient runoff will account for about 5 percent of the total feed when combined with reclaimed condensate topped with municipal water.

Holmes estimates the extra cost for the new facility's water reclamation will run roughly \$250,000. "In a market where there's a lot of concern about price compression, cutting cost is kind of an everyone's plate," he says. "But part of our philosophy is being environmentally conscious. We know it's an added cost, but we conserve and save on water and nutrients."

Holmes urges growers to collect and use the water that equipment generates. "I know a lot of growers are concerned about heavy metals with the setting coming up soon in California and all the regulations, but if you set up your reclamation program correctly, you're not going to have any issues," he says.

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"I think the industry, especially the indoor and high-tech greenhouse growers, has to start moving toward a more environmentally friendly system and way to cultivate," Holmes says. "Water is one thing we can conveniently start to conserve and reclaim and use."

WATER ADVANCES FOR SUSTAINABILITY AND SURVIVAL

With a new 200-acre facility planned for southern New Mexico, water is a focal issue for the Ultra Health CEO Duke Rodriguez. "One of the weakest areas in the entire cultivation industry is understanding and acknowledging the pressures related to making certain there is sufficient water and limiting the loss of water in the grow cycle," Rodriguez says.

When the company's current operation launched near Albuquerque, hard lessons on water waste with municipal water and reverse osmosis came fast. "You can see the immediate failure," Rodriguez says. "You access the water system. Then you run it through RO systems and you can lose up to 30 percent in stripping water of the additions made by the municipal system."

Water efficiencies and conservation are critical to success for the company's new operation, which will include indoor and greenhouse production as well as cannabis and hemp fields. As a result, project plans incorporate multiple measures to harvest and conserve water.

Water rights roughly equivalent to 329 million gallons per year were co-acquired with the parcel purchase. Rainwater will be harvested from the 140,000-square-foot production building, and recaptured greenhouse condensate will be recycled to feed hemp fields.

"We have to look to the future and know that in all probability, it's very likely that agri-business operators will be asked to cut back," Rodriguez says. "I think it's somewhat irresponsible to believe that as long as there's water at the tap, there's plenty of water to do whatever you want in cultivation."

Rodriguez stresses the need to push for increased efficiencies in water technologies and for every cannabis producer to address how he or she plans to come up with a solution for water. "I believe water will become [the industry's] single most-discussed resource going forward," he says.

He also sees a positive side. "Once you begin to take on a discipline of trying to be more responsible with water, a real plus is [that] there seems to be an outgrowth of it. You begin to take the same discipline to other areas of use," Rodriguez says. "You begin to value and question your impact and environmental or carbon footprint, and I think that's a good outcome."

Bryce Nichter, COO, Zen Group, Washington state

Bryce Nichter's first water reclamation install was driven by necessity: a 30,000-square-foot indoor facility lacked a municipal sewer connection. By adding an Automated Reclaimed Condensate System (ARCS) by HydroLogic Purification Systems to reclaim HVAC condensate, Nichter was able to limit wastewater significantly. The systems have become standard for his installations as Zen Group COO.

Nichter compares HVAC condensate to distilled or rainwater, but he warns against using condensate without further treatment.

"The precipitate water is dangerous for a couple of reasons. Although it is pure from a mineral standpoint and has very little dissolved solids, there can be some heavy metals and certain types of glues and solvents from the [equipment] coils and plumbing. Those contaminants can be toxic to a plant," he explains.

"Even more importantly, because it's a constantly wet environment—it's trickling a lot of water, but slowly, over a long period of time—there can be a lot of bacterial growth that can be harmful to a plant coming out of that effluent," Nichter says.

The HydroLogic ARCS earns Nichter's praise because it targets reclamation. "It focuses specifically on capturing and remediating the things that could come off the precipitate from your HVAC systems," he explains. "It can also operate at lower pressures, as water comes in slowly. It filters potential contaminants, but there's also sterilization to manage the potential microbial component as well."

Nichter sees an 80-percent return of water using this method. An added benefit is that the ARCS doesn't produce a waste stream like reverse osmosis, but its benefits extend beyond conservation.

"We're incentivized by the price of marijuana to have really high-quality water, because there's a linear correlation to your yield. But large RO systems are very expensive," he says. "By recycling this much water, you don't have to buy as large an RO system to feed your business. You get high-quality water and an overall savings from the water bill and the initial capital expenditure of your reverse osmosis system."

Nichter encourages growers to work water reclamation systems into development time lines from the start. "It's tougher to add them in down the line than to do it on the initial install," he says.

"As an industry, we're learning. ... We're digging in and trying to build businesses to truly last. When you learn how to do that, you want to focus on sustainability and ROIs that pay out in the long run," Nichter advises. "As margins get lower, there are certain efficiencies to not only keep the community and regulators happy, but there's actually some financial savings."

Jolene Hansen is a freelance writer, former hort professional, and frequent contributor to GIE (mailto:jolene@lovesgarden.com).

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