Water Reuse: Lessons from California

By Dan Peckham

The West Coast’s water problems often seem a world away, and in some senses, that’s accurate: water quantity issues are generally of greater concern in the arid West than here in the Northeast. However, as many groundwater basins around the world show significant stress and depletion, some of the responses to water scarcity that are under discussion and underway in California warrant a deep dive.

Recycled water, widely carried via purple pipes to differentiate it from potable water, is frequently mentioned as a tool to address water shortages. Rethinking how we use and reuse water makes logical sense: we treat water to potable quality, only to sprinkle it on our lawns or flush it down the toilet. There are many uses of water that can be planned sequentially to maximize the value of each drop treated and to minimize the need to treat all water used to potable standards. The movement towards fit-for-purpose use (water that is treated or diverted after its first use to meet water needs with less stringent standards) is picking up steam, but many obstacles remain.

Considerations involved in water reuse are extensive. EPA and U.S. Aid’s “2012 Guidelines for Water Reuse” spends more than 500 pages on the subject. Direct potable reuse involves reclaiming water from a waste stream that is treated and then goes directly back into the drinking water treatment plant. Indirect potable reuse denotes the practice of sending treated wastewater first to a source water (e.g., a reservoir or aquifer), from which the water eventually ends up back in the drinking-water treatment plant. Although cities downstream from a wastewater treatment plant practice indirect potable reuse every day, potable-water recycling solutions often must battle the stiff opposition from the public based on the “yuck factor” of drinking water that was recently sewage.

Nonpotable reuse opportunities include agricultural and urban irrigation, groundwater recharge, commercial uses, and even geothermal energy. Each use comes with challenges. Customers purchasing reused water will each have treatment standards, temporal variability in usage, and a specific location to which they need the water delivered. Where the general public may come in contact with recycled water (at golf courses, for instance), furthermore, education and outreach are critical and messaging is not easy.

Despite these challenges, water reuse has the potential to achieve a number of goals. Increasing populations in the United States and around the world will require more food and energy, both of which are water-intensive processes. Water reuse can provide elegant ways to address these growing demands. Recycled water has also been used to augment flows in sensitive stream ecosystems.

An acre foot is the volume of a foot of depth over an acre; it is equal to 43,560 cubic feet. In California 670,000 acre feet of the municipal wastewater produced each year are recycled, and that number is increasing. While that may seem like a lot, it accounts for less than two percent of the state’s total yearly water usage of 40 million acre feet. The Pacific Institute estimates additional water reuse potential at 1.2 to 1.8 million acre feet per year, but the total still would only amount to six percent of the state’s total water use.

Finally, any conversation about solutions to environmental issues must identify and compare costs. Research by the not-for-profit Next 10 organization (see table) suggests that reuse options, though not the cheapest, have roles to play in addressing both urban and agricultural water deficits for the state.

Household use of gray water, municipal wastewater recycling, and urban stormwater recovery,
Alternative irrigation practices ($43 per acre foot), providing incentives for residential conservation efforts ($163), and coordinated surface storage and groundwater management ($112), which are not reuse options, are some of the cheapest water-saving practices available. However, these three combined have less potential than municipal wastewater recycling alone. Retiring irrigated lands, on the other hand, addresses more than all of the water reuse options combined—almost 2 million acre feet. Note that these figures were calculated based on assumptions specifically for California, and could be significantly different in the Northeast.

In the end, water reuse belongs in the water-scarcity toolbox, but it is no cure-all, and is not the cheapest of the options available. Reuse deserves a place in the conversation, and promising new technologies will likely drop costs significantly over the next decades.

Most importantly, a proper policy and regulatory framework needs to be set in California and anywhere else where better water reuse is desired. The National Resource Defense Council’s December 2015 report, “Thirsting for Progress: A Report Card on California’s Response to the Drought,” outlines steps that need to be taken to improve stormwater and recycled water reuse. Among the first of these is establishing targets and adopting regulations to promote and manage desired activities. Without this foundation, water reuse efforts will be uncoordinated and will have trouble gaining traction.

In the Northeast, Massachusetts, Rhode Island, and Vermont have published guidelines or regulations for water reuse that provide requirements for monitoring and/or conditions for water quality. The remaining Northeast states that do not have guidance or regulations may instead approve projects on a case-by-case basis.

Water reuse hasn’t received the same publicity in our region but deserves consideration when thinking about water resource management. Land development, irrigation for landscaping, and extended dry periods resulting from climate change may stress water supplies in the future.

As in the West, water reuse in our region extends the lives of septic systems, reduces nutrient pollution, and lessens the demand on drinking water supplies. Connecticut recently released two case studies on water reuse in the state, for alternative wastewater treatment and recycling at a spa and for use of reclaimed water for irrigation at a golf course. These and other reuse case studies advance the state of technology on this issue and help prepare us for the possibility of greater water scarcity in the future.

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