Our Ocean Backyard

Gary Griggs

Column No. 345

Our Future Water Sources

We will never run out of water on Earth, but we are running low on fresh water, locally and globally. Each of the water agencies around Monterey Bay is looking at multiple alternatives for providing water to customers in this 2nd year of a major drought and beyond.

The Santa Cruz citizen’s Water Supply Advisory Committee’s recommendations in 2015 included 1. water exchange with neighboring water agencies including the Soquel Creek Water District; 2. banking excess surface water (when available) in a groundwater basin; 3. recycling treated wastewater through advanced treatment for specific uses; and 4. desalination, as possibilities for the Santa Cruz City Water Department customers. The first two of these, however, are dependent upon average or above average rainfall and runoff, which has been lacking the past two years.

Banking any excess water in the ground through the city’s existing Beltz groundwater wells in Live Oak or new wells in the mid-county groundwater basin for later use has been studied extensively since 2015. Abbreviated as ASR, or Aquifer Storage and Recovery, this project involves pumping treated water from the Graham Hill Water Treatment Plant on Graham Hill Road to the Beltz wells where it would be stored in the basin and later pumped back out. The objective of the current studies is to understand any operational or water quality constraints of this strategy, including having enough excess water in Santa Cruz to pump to the wells, which ultimately would be relied upon to help meet city’s needs when rainfall and runoff are low.

Recycling the city’s treated wastewater for beneficial uses such as irrigation, groundwater replenishment, surface water augmentation and direct potable usage is also being evaluated. These types of projects have the distinct advantage of not requiring any new water source and instead reusing an existing source. Barriers with recycled water are mainly psychological as technology has been proven with facilities around the globe, the U.S., and in California (such as Orange County and Monterey).

One approach would be sending our existing secondary treated wastewater, currently discharged to the ocean, from the Neary’s Lagoon plant to Soquel Creek Water District’s PureWaterSoquel project for advanced purification. This treated water could then be used for parks, golf courses, groundwater recharge, or pumped to Loch Lomond where it would mix with a much larger volume of water and ultimately be pumped to the Graham Hill Road treatment plant for treatment and distribution within the city.

Recycled water alternatives would require investment in expanding the PureWaterSoquel advanced purification system. This project has a planned capacity of 3,000 acre-feet/year, or double the current capacity, a volume determined by the Santa Cruz Mid County Groundwater Sustainability agency needed to bring the basin operations into sustainability. If this volume of water could be achieved, the city would receive half of this, or 1,500 acre-feet/year.

An acre-foot (about 326,000 gallons) is a difficult volume to picture; think of a soccer or football field covered with a foot of water. This will meet the annual indoor and outdoor water needs of 4 to 5 families in our area, so the 1,500 acre-feet that could be withdrawn from the City’s project, if successful, could provide for the annual water needs of about 6,000-7,500 average households. Put another way, this is about 6% of the volume of our one large reservoir, Loch Lomond, or about two months of the city’s typical water usage. If this turns out to be a success, it would be an important addition to the city’s water supply. It’s a big if, however, which is what the pilot project and feasibility studies are all about.

Associated with both groundwater storage options (using excess surface water and purified wastewater) are avoiding chemical interactions and water quality changes when introducing a new water source to the groundwater basin, and equally important, how much of that recharged water can actually be recovered or pumped back out of the aquifer from the mid-county basin following recharge when the city has needs during a drought?

The remaining option, desalting seawater, faces significant hurdles. The major advantages are that it doesn’t require rainfall and there is a lot of water in our ocean backyard, 97.5% of all the water on the planet, or about 332,000,000 cubic miles of it. The most widely-used desalination technology, pushing seawater through a semipermeable membrane, has been used for years and is carried out in 120 different countries worldwide. The list includes a number of Middle Eastern nations (Saudi Arabia, Oman, UAE, and Israel), Mediterranean countries (Greece, Portugal, Spain, Italy, Gibraltar, Cypress and Malta), as well as Australia, China, Japan and the United States. Globally, desalination provides for the water needs of about 300 million people, or about 4% of the world’s population. In volume, however, this only about 0.5% of the planet’s total freshwater use.