Looking Down the Well

by Gerhard Epke
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Looking out of my window at the assortment of suburban trees and bushes blooming pink and white and glistening with green after a June rain, one would not know that we are in the midst of a severe drought. The real drought must be happening in the rest of California. Here in Marin we tend to consider ourselves exempt from the greater California water delivery system and its issues: the Sierra Nevada reservoirs, delta smelt, the California Aqueduct, and the poor San Joaquin River. Our reservoirs here in Marin have plenty of water, so what is the problem? Well, the creeks, including Corte Madera Creek and its tributaries, are very low and our groundwater table is lower than usual.

This spring the State mandated a reduction in all municipal water use, bringing the issue of the drought home to us in Marin; I am concerned that this might lead to an increase in the exploitation of groundwater with the long-term effect of local creeks being sucked dry. The problem is that we aren't even tracking data to know if this is happening.

The State Water Resources Control Board has imposed a 20% reduction in municipal use upon Marin Municipal Water District. What is not mandated is any kind of oversight or restrictions on groundwater pumping. In parts of California's Central Valley, every generation of farmers has had to dig wells 10 times deeper than they were previously. New wells are going down thousands of feet, land has subsided tens of feet, and it would seem the race to the bottom has almost reached the end. A new law, the State's 'Sustainable Groundwater Management Act' is poised to address this, but its enforcement is based upon a prioritization of groundwater basins. Here in Corte Madera Creek watershed we are a low priority, so no plan or enforcement is required here.

Well heads close to the creek can directly lower water levels and affect aquatic wildlife; wells further away have an unknown effect on the creek, but deplete the aquifer that feeds the creek throughout the dry season. Photo by Lou Vaccaro

Forty years ago we experienced a drought this severe. In 1976 and 1977 it hardly rained for two winters in a row. Many wells were drilled during those years in Marin County to keep landscaping alive, and much of our understanding of the local groundwater characteristics comes from that time. We know, for instance, that the local geology, part of the metamorphic Franciscan complex, is very compact and contains very little water. These rocks gradually erode, becoming the valley floor clays that also don't bear much water. Most wells drilled into these clays have low rates of production: even a 40-foot deep well might only be able to sustain a few gallons per minute. A few wells, in particular those that are adjacent to creeks, penetrate pockets of very porous gravel and have higher production rates. The problem is that these wells often pull water straight from the creek flow.

Marin County does require a permit for installing a new well, but this is intended to make sure groundwater does not become contaminated by, for instance, drilling your new well through a sewer line. There are no meters on wells. No one asks how much you pump. And there is no requirement to consider the well's impact on nearby creeks.

Whether or not the drought continues, we should consider ways of addressing this before all our creeks are sucked dry. Ross Creek, which used to flow year-round, is a case-in-point of what can happen when the use of wells goes too far. Enough of the adjacent landowners have developed wells for filling swimming pools and irrigating gardens, that these days the creek is usually bone dry by mid-May. Water conservation and the

search for alternatives to municipal water use are clearly good ideas, but because of its potential effect on creek levels, the use of wells as a source of irrigation water should be considered on a case-by-case basis when there is a direct link to a nearby stream.

The relationship between groundwater pumping and creek levels is slowly emerging in the consciousness of our State, but without research institutions or large grants we are not developing an understanding of it here in the Corte Madera Creek watershed. One way to begin understanding this relationship would be in the science programs of local elementary and high schools. Because so many schools happen to be along creeks and use wells for irrigation, the most expensive and time-consuming part of these experiments is already set up. By augmenting the pumping or irrigation schedules with either a few inexpensive sensors or existing meteorological data, students could be introduced to environmental monitoring in a meaningful way. Models for engaging school-age youth in environmental monitoring already exist and are developing good track records. Engaging a model like this now in Marin County might serve to raise both awareness and knowledge about the current condition of groundwater.