SUBMITTAL TO THE BOARD OF SUPERVISORS
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA

FROM: Supervisor Buster **SUBMITTAL DATE:** October 27, 2011

SUBJECT: Recycled Water: The Regulatory Gap and the County's Role

RECOMMENDED MOTION: That the Board of Supervisors:

1. Direct the Chief Executive Office and County Counsel to consult the Environmental Health Director, Agricultural Commissioner, UC Riverside scientists and other agricultural water experts to ascertain County authority to review local water district proposals to replace current irrigation sources with recycled water.
2. Direct the Chief Executive Office and County Counsel to report their findings and recommendations to the Board of Supervisors within 60 days.

Background:

With water scarcity and cost rising, local water districts are under pressure to switch County agricultural uses to recycled water. The state Department of Public Health regulates drinking water potability. And the state's regional water boards gauge the quality of surface discharges so that streams and underground water tables are not impaired.

Yet no public agency focuses on the serious issues posed by recycled water use on agriculture – on the land, the farmer and the industry. The County has the ability and interest in doing so and has been the customary forum for farmers over many years.

The current proposal by Western Municipal Water District (WMWD) to supply citrus groves in the El Sobrante area with recycled water from the March sewer treatment plant is a good example of the gap in oversight.

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Bob Buster

Bob Buster, County Supervisor
1st District

Prev.Agn.ref. **Dist.** **AGENDA NO.** 3.42

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Rev. 12/9

Two years ago the City of Riverside abandoned a plan to use its own treated effluent on Greenbelt citrus farms after UCR soil scientist Prof. Christopher Amrhein warned that boron, sodium and chloride in recycled water could damage trees, crops and render soils unusable for citrus and avocadoes. Ohio State University researchers also have determined boron elevations can have deleterious impacts on vineyards and grape production. (Study findings attached).

On September 27, 2011, the Riverside County Farm Bureau sent a letter to Western Municipal Water District expressing concern over the potential damage to agriculture from the elevated salt levels in the recycled water.(Letter is included).

WMWD, however, maintains that the levels of boron and other salt constituents in its recycled water are safe for agriculture and well within standards set by the Water Quality Control Plan for the Santa Ana River Basin.

Which agency is right?

Farmers and farmland should not be put at risk if the issues surrounding recycled water have not been settled decisively. Farmers, a shrinking minority in most water districts, need and deserve the independent and competent review of such plans that the County of Riverside can provide.(Such a review, in addition to checking water quality, could also determine whether there were adequate safeguards against raw sewage or improperly treated wastewater entering the agricultural system.)

KEEP CITRUS WATER CLEAN // Recycling project threatens the city's greenbelt

June 11, 2009

By CHRISTOPHER AMRHEIN THE PRESS-ENTERPRISE
{SOURCE:+}

The Riverside City Council is considering a project to replace the water in the Gage and Riverside canals with reclaimed sewage water, as a way to free up high-quality water for development. People interested in the health of the Riverside agricultural greenbelt should be concerned about this water exchange.

Originally, the proposed area that would receive this water was 5,000 acres of designated agricultural greenbelt land, encompassing the California Citrus State Historic Park (186 acres) and the 510-acre Citrus Research Center and Agricultural Experiment Station on the UC Riverside campus. Included in this land is the Citrus Variety Collection, which is a germplasm repository of approximately 1,000 types of citrus. This collection, the research groves, and the commercial orchards and nurseries of the greenbelt have been irrigated with high-quality water since their first planting.

PROTECT GROVES

Based on scientific studies of the effects of the chemical boron in irrigation water and the effects of reclaimed water on citrus and avocados, this project could damage the groves. Recycled wastewater - so-called reclaimed water - can be used for irrigation, but not on citrus or avocados in southern California. The concentrations of boron, chloride and sodium in the reclaimed water will damage leaves and cause problems with fruit quality and soil permeability.

Citrus, avocados and many ornamental plants are very sensitive to boron, and the concentration in the reclaimed wastewater is likely to cause leaf damage (yellowing and dead tissue at the edges) and yield reductions for growers.

In addition, the higher sodium content in reclaimed water will reduce soil permeability and make leaching of accumulated salt a problem. Soils in the Riverside area typically have clay- and silica-rich subsoils with low permeability. Controlling salt and boron accumulation in the root zone will become more difficult with reclaimed water.

In a six-year field study near Escondido, avocado trees irrigated with reclaimed water had a 42 percent yield decrease compared with trees irrigated with municipal water. Trees irrigated with a fifty-fifty blend of reclaimed water and municipal water had a 27 percent reduction in yield.

These declines were attributed to elevated chloride, sodium and boron concentrations in the reclaimed water. The accompanying reduction in soil permeability caused excessively wet soil, allowing a root fungus disease to thrive. The stressed trees were then invaded by mites, which caused additional damage.

Riverside Public Utilities conducted a study from 2006 to 2008 using reclaimed water to irrigate citrus and found salt accumulation at one- and two-foot depths in the soil that significantly exceeded the threshold for salinity damage to citrus. The salt accumulation indicates inadequate leaching or flushing of the root zone by percolating water.

It has been estimated that 80 percent to 90 percent of the boron in reclaimed water is from laundry detergents. Israel, where reclaimed water is extensively used for irrigation, has banned boron in laundry detergent.

CONSIDER BANS

Prohibiting both boron in detergents and residential salt-based water softeners within the Riverside wastewater district could greatly increase the usability of reclaimed water for irrigation. In the meantime, irrigation with reclaimed water should be restricted to soils and plants that will not be damaged by the sodium and boron in the water.

Growers who will be forced to accept reclaimed water for irrigation may have to adjust the types of plants grown, change irrigation practices to increase leaching, and apply minerals to maintain soil permeability.

Based on my 30 years of study and research in soil and water chemistry, I can assure the Riverside that irrigation with reclaimed water will harm citrus, avocado and many ornamental plants grown on Riverside soils.

The city should reconsider this project, or accept the gradual loss of citrus in the greenbelt.

* * *

Christopher **Amrhein** is a professor of soil chemistry in the Department of Environmental Sciences at UC Riverside.

Art: PHOTOS

Caption: (1) MARK ZALESKI/THE PRESS-ENTERPRISE / Riverside should rethink a plan to replace Gage and Riverside canal water with recycled wastewater that would harm citrus groves at the State Citrus Historic Park and at agricultural research facilities at UC Riverside. (2) 2008/THE PRESS-ENTERPRISE / Citrus growers need to use high-quality irrigation water

reclaimed water contains high concentrations of chemicals that inhibit fruit quality.

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Affiliated with the California Farm Bureau Federation and the American Farm Bureau Federation

September 27, 2011

Mr. John Rossi
General Manager, Western Municipal Water District
14205 Meridian Parkway
Riverside, CA 92518

Dear Mr. Rossi,

The Riverside County Farm Bureau (RCFB) is very concerned with Western Municipal Water District's (WMWD) plan to move forward with supplying citrus growers and nurseries in the Riverside area with recycled water for irrigation purposes. These growers currently irrigate with non-potable ground water from the Riverside Canal.

Growers in your service area are worried about the amount of boron (B) and sodium in recycled water. Based on a six year study, Dr. Christopher Amrhein from U.C. Riverside concludes that B "...will harm citrus, avocado and many ornamental plants grown on Riverside soils." The B danger is increased by elevated sodium levels in the recycled water which will limit the amount of leaching that can be achieved. Furthermore, in the study completed by Trussell Technologies and paid for by WMWD, their conclusion says, "...an increase in the irrigation water B concentration from 0.19 to 0.33 mg/l would likely not be a threat to orange production. However, this situation could arrive if low LFs (Leaching Fractions) are used or if regional soil types favor high soil-water B conditions."

Trussell Technologies also points out that there are too many local factors that affect how B in the irrigation and soil-waters interrelate. They point-out that "Hotter, more arid climates produce toxic conditions at lower B levels than cool, moist climates." "Given the number of local factors involved, it is often difficult to extrapolate safe irrigation water B levels from one region to another."

It is obvious, Mr. Rossi, that the high concentrations of B in recycled water combined with the heavy clay soils of Riverside, and the hot, arid climate of our region, that the use of recycled water by the citrus and nursery industries in the Riverside area will eventually kill the industry over time.

Moreover, Trussell Technologies states that "The fact that reclaimed waters are often higher in concentrations of salts, particularly boron, chloride and sodium, is the leading cause of concern." As noted by Dr. Amrhein, the elevated sodium levels in the recycled water will cause problems with soil permeability making it difficult to control

harmful accumulations of all salts, including chloride as well as boron. Addressing boron levels alone will not resolve the issue of over-all salt accumulation due to the effect of elevated sodium on clay-rich soils.

The RCFB believes that it would be most beneficial to the citrus growers and nurseries in the area if the WMWD would investigate ways to either begin removing B and sodium from the recycled water or use the recycled water to irrigate street medians and parks where it can be safely used. Of course the best solution to this dilemma is to continue supplying growers with the non-potable water they have been receiving from the Riverside Canal. All costs associated in solving the B problem should be borne by those who generate the waste water, and not just passed on to agriculture.

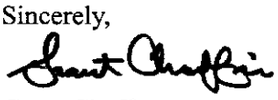
Citrus farming in Riverside County is a $140.5 million industry while nursery stock production adds another $169.3 million to the economy of Riverside County. Is WMWD willing to sacrifice a portion of these industries knowing that eventually high concentrations of B and salts will destroy these crops?

In conclusion, the use of recycled water in the Riverside area will eventually destroy the citrus and nursery production industry because of the high concentrations of B and salts in the water. That combined with many local factors including soil types and a hot, arid climate, all add to the eventual destruction of the citrus and nursery production in the Riverside area.

Crops and soil conditions are highly sensitive and the risk of long-term consequences is too great to get this wrong. We appreciate WMWD's desire to reuse water, and we are confident that there are appropriate irrigation uses for it such as landscaping, parks, mediums, etc. where there are no economic consequences should WMWD's assumptions be incorrect.

The RCFB urges WMWD to re-evaluate the use of recycled water in the Riverside area for citrus and nursery production. Growers in that area cannot afford to lose their livelihood due to a poor decision by WMWD.

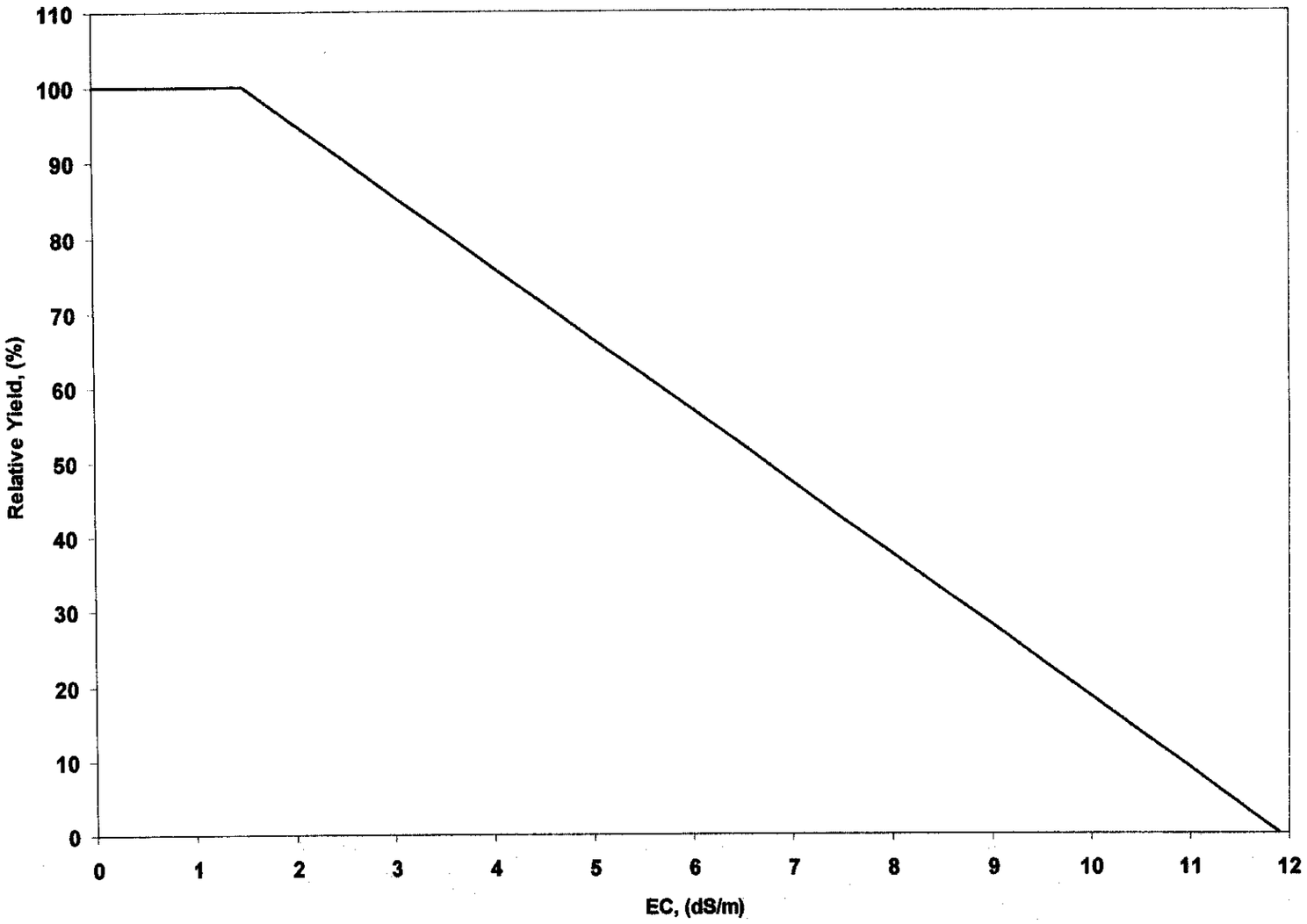
Sincerely,



Grant Chaffin
President

CC: RCFB Board
WMWD Board
RWQCB Board
Kurt Berchtold, Executive Director, RWQCB
Malissa H. McKeith

Grape Yield Potential vs. Soil Salinity



Irrigation Water Quality
Boron

- **Grapes are very sensitive to boron**
- **Threshold soil concentration for yield reduction: 0.5 - 0.7 mg/L**
- **Typical Boron toxicity symptoms for grapes are spotting, yellowing and/or drying at tips and edges of older leaves**