Volume 15 No. 3 May - June 2004

KRCD
Kings River Conservation District

Water. Power. Environment. Reliable resources for the Valley.

IRRIGATION NEWS

Water Quality-The Choice is Yours

Have you as a grower or land manager made your decision as to how to comply with the ag discharge regulations set forth by the Regional Water Quality Control Board? Which option is best for you? Do you file as an individual, covering all the associated costs yourself or do you opt to become a member in a water quality coalition? Technically, the deadline imposed by the State Water Quality Control Board for individuals was last November, with ag water quality coalitions needing to have their membership lists in place on July 22, 2004. The coalitions are required by the Regional Board to have the following information available for review by the Regional Board as a matter of compliance with the waiver:

1. "At a minimum, the coalition groups must maintain a list of all farmers who have knowingly elected to join the group, contact information, and information that the Regional Board needs to determine the location of each participant."

2. "We will not require that all the information be transmitted to the Regional Board, since Board staff acknowledge that they will not review all such information immediately, but it must be available upon request and the Regional Board should request information if monitoring information shows that water quality standards are exceeded or if there is other evidence of violations of the waiver."

One of the more common questions asked by growers is "Do I have to join the Coalition (or file with the Regional Board) if (1) no tail- or storm water ever leaves my land; or (2) I don't take ditch water? The simple answer is if you apply irrigation water to your land for the purpose of crop production, regardless of source, you are subject to the requirements of the waiver. No distinction exists within the waiver language for land that has little or no potential for runoff. The grower would still be responsible to submit a monitoring plan and water quality data to the Regional Board or to join a coalition.

Another common question is "How much is this going to cost me if I join the coalition?" At present, the costs associated with the development of a monitoring plan and the associated lab fees for sample processing are going to be shared between the Kings River Conservation District (KRCD) and the Kings River Water Association (KRWA). This provision should remain in effect for the life of the current waiver, which should be in place through December 2005.

"What are the consequences if I fail to file as an individual or join a coalition?" Failure to comply with the Waiver regulations could lead to administrative penalties, including fines and legal orders to cease and desist, which could effectively shut a grower down indefinitely.

"What happens if something is detected?" The first step is to file a communication report with the Regional Board. The Coalition would then work with the Regional Board to determine the cause of the problem, and then work with the member growers in the area. It is hoped that no problems are detected and, if they are, can be corrected through appropriate, voluntary changes in management practices. Best management practices, including integrated pest management, would be promoted to the local growers in a coordinated effort with local farm bureaus, ag commissioners, NRCS, UCCE, etc. to minimize future risks.

Election to participate in the Southern San Joaquin Valley Water Quality Coalition is easy. For those who have not yet signed up, and are in the Kings River service area, you may call KRCD at 237-5567 ext. 117 or ext. 126 and leave your name, address and phone number. An election form with a more detailed information request will be sent to you.

Geologic Survey on Water Use

A recent news article published in the Irrigation Association E-Times reported on a five-year study conducted by the United States Geologic Survey. The conclusion of the study should be pleasing to growers: "Americans are using less water." According to the study, in the year 2000, Americans used about 408 billion gallons of water per day, almost the same as in 1985. What makes this interesting is that the population has grown significantly in the last 15 years. Another aspect of the report shows that the usage per person has declined since the 1970's.

Agriculture, for all the perceptions that it is a wasteful user of water resources, has not changed the amount of water it uses in the last 50 years, even though crop acreage has doubled during the same period.

The whole report can be viewed at http://water.usgs.gov/pubs/circ/2004/circ1268/.

NOTE: AGLINE phone service will resume in July. Data is now available at www.krcd.org.

Agronomy 101: The Macronutrients

When growers think of plant nutrition, they usually think of the "big three" elements: nitrogen, phosphorus, and potassium. But how many of the other 15 elements can they name? Understanding the roles each element plays within a crop can help the grower to know why they need to add more of this, or less of that. This article examines the major nutrients required for plant growth, their common forms, and their roles within the plant.

Plant nutrients fall into one of two categories: macro- and micronutrients. A macronutrient is defined as one that comprises between 0.5 percent and 3.0 percent of the plant's dry weight. Anything less than 0.5 percent is considered a micronutrient. Of the 18 known elements that are required for plant growth, 10 are classified as macronutrients. Micronutrients rarely need to be applied to crops, and are the most likely to cause toxicity problems.

Some of the required elements come straight from the environment. Carbon, oxygen, and hydrogen come directly from their common forms, carbon dioxide and water. Carbon is the basic building block for all organic compounds. Oxygen is a powerful reactive agent within the cells. Hydrogen is used to promote certain chemical reactions.

Nitrogen (NO3-, NH4+) is one of the most important plant nutrients. It is essential in the formation of amino acids, the building blocks for proteins. The plant roots obtain nitrogen from the soil in either its nitrate (preferred) or ammonium form. The correct amount of nitrogen within the plant will promote the proper balance between vegetative and reproductive growth, but excessive levels will promote rank growth, excess water usage, and encourage pest problems.

Phosphorus (as phosphate, H2PO4-) is necessary for the formation of the molecules AMP, ADP, and ATP (adenosine monophosphate, diphosphate, and triphosphate), which are critical in transporting chemical energy from one place to another within the cells. This chemical energy is required to drive the chemical reactions necessary for the formation of proteins, sugars, or other complex molecules. Once absorbed by the plant root, phosphate ions are bound to a carrier molecule for use within the plant.

Potassium (K+) is used by the plant to regulate the water content within the leaves (specifically the stomates that control water movement out of the leaf) and as an activator for certain enzymes. A plant will absorb all the potassium it can, even if it already has an ample supply and no deficiency exists. Potassium does not form lasting chemical bonds when in solution, and its primary benefit is in changing the ionic balance within a cell.

Sulfur (as SO4-2) is a component of two specific amino acids, a couple of vitamins, and an enzyme critical to the process of forming and breaking down fatty acids within the cell. According to a reference in the fourth edition of Plant Physiology (Salisbury and Ross, 1991), the amount of sulfur required by a plant is typically 1/15th of the nitrogen demand.

Calcium (Ca+2) is critical for maintaining cell wall integrity. Without this element, the membranes would leak and the cells would eventually die. It also plays a role in enzyme activation. It is relatively immobile within the plant, so deficiency symptoms are visible in the youngest tissues first.

Iron (Fe+2 or Fe+3) is a critical element used in photosynthesis and the formation of chlorophyll. Like other metals, its role is that of an electron carrier during specific photosynthetic and respiration reactions.

Magnesium (Mg+2) plays an important role in many plant reactions. It is the core element in chlorophyll, the compound responsible for photosynthesis. It helps reform ATP from AMP and ADP in the cell, and activates several other enzymes involved in DNA (deoxyribonucleic acid) synthesis.

Each of these elements is readily available in most soils but the ability of the soil to deliver them in sufficient quantities can be limiting. Many key nutrients are pH dependent. Getting the most from your soil means keeping the soil pH (acidity/alkalinity) as close to ideal as possible, between 6.5 and 7.0.

Table: The 18 Currently Recognized Nutrients Required for Plant Growth.

Macronutrients	Micronutrients
Carbon	Sodium
Hydrogen	Chlorine
Oxygen	Copper
Phosphorus	Zinc
Potassium	Manganese
Nitrogen	Molybdenum
Sulfur	Cobalt
Calcium	Boron
Iron	
Magnesium	

Questions regarding this or any other irrigation related issue should be directed to KRCD's Eric Athorp at (559) 237-5567, ext. 117. Pump evaluations and irrigation performance testing services are also available.

IRRIGATION
N E W S
KRCD

Reprint freely with credit to:
Irrigation News, a bimonthly publication of the Kings River Conservation District

For more information contact
Eric Athorp at
(559) 237-5567 ext 117
www.krcd.org

Kings River Conservation District
4886 E. Jensen Avenue
Fresno, CA 93725-1899

NON-PROFIT ORG.
U.S. Postage
PAID
PERMIT NO. 1687

RETURN SERVICE REQUESTED