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KRCD
Kings River Conservation District

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IRRIGATION NEWS

Multiple Source Irrigation Strategy

Paul Toste is a third generation farmer near Kerman. He has recently taken over the family farm that began as a small dairy in 1949. Over the years, the operation diversified into field crops such as cotton, alfalfa and pastureland. His father added vines in the 1970's and expanded into almonds in the early 1980's. The dairy is now gone and the almonds now account for 390 of the 555 acres, of which 270 acres are in production.

Paul, a practicing veterinarian for the last 21 years, favors flood irrigation over micro irrigation. "The land is level," he says. "The infrastructure already exists. I just can't justify the costs of switching over. I also think the trees like flood irrigation better."

His system consists of four electric wells and three diesel pumps, along with a lift pump for surface deliveries when available. This translates into considerable flexibility.

"I can balance the system based on irrigation need," he says. "If I need less water, I run fewer pumps. The diesels are capable of supplying all the water the ranch needs, and we run them during peak hours if the water demand is high. Right now, the electrics cost us less to run, especially on a time-of-use schedule."

The disadvantage to the system is time management. "To save the most amount of money with this system, I must trust that my irrigator is watching the clock. He must switch from electric to diesel as close to 12 noon as possible, so as to avoid peak charges for electric, but also limit the amount of diesel consumed."

Toste's philosophy on irrigation scheduling is decidedly low-tech. "I base my schedule on ambient air temperature. If the temperature is less than 95 degrees, a 10 to 14 day irrigation schedule is used. Once the temperature rises to 100, the schedule is adjusted to every seven days in the almonds. The vines stay on a 21-day cycle throughout the growing season." His sandy loam soils can support this schedule as they hold water very well; yet have good infiltration rates when the water is applied.

Paul Toste prefers flood irrigation for his farm.

Toste doesn't use soil moisture probes (tensiometers, gypsum blocks) to tell him the condition of the soil. "In my mind, visual observation is the key. The trees tell what I need to know. Once the trees begin to look stressed, I make plans to irrigate." The strategy seems to be paying off. A block of recently planted almond trees (second leaf, two years old in January 2006) appears to be healthier than some plantings that are five years old.

Surface water is a rare sight in his part of the Kerman area. "I have a tail-water ditch that I can draw from occasionally," says Toste. "It allows me to run one less groundwater pump when it is here, but I generally make my plans as if it didn't exist. This year was different, of course."

Groundwater Levels Improve in Latest Survey

It would appear from the data collected during Fall Well Survey conducted by KRCD staff, that in some areas of the district the noted declines in groundwater depth appear to be easing. While the long-term trends still indicate that the depth to standing groundwater is increasing, the recent wet winter, along with some cropping changes, has slowed the rate of decline in some areas, and may be contributing to a rising water table in others. A more complete analysis of the available data will be required to determine if this improvement is temporary or part of a sustained recovery.

The Utility of Flowmeters

Mention flowmeters to just about anyone and you are sure to get a strongly felt opinion about them. "It's a beneficial tool," some will say. Others will rail against them as yet another potential means of government oversight of their operations. In a strange sort of way, both perceptions are correct, depending upon the use of the data they provide.

The basic function of a flowmeter is to provide "real-time" data as to the volume of water delivered from the source to the distribution system. Typically, these meters read the flow in gallons per minute, but the gauges can be calibrated to read in acre-feet per day or cubic feet per second. Care should be used when looking at this data, however: gauges typically fluctuate between a high and low value, so look for the average position of the meter or display.

An additional feature on many gauges is the inclusion of a "totalizer". This is very similar to the odometer in a car, and shows the total volume that has been delivered past the meter. Again, this can be calibrated in many ways, from total gallons to acre-feet.

The most common type of flowmeter is a propeller driven mechanical meter. An impeller is placed within the discharge pipe (calibrated to the inside diameter of the pipe), where it rotates in response to the movement of water from the source to the discharge. The unit itself can be either a separate component that is spliced into a discharge pipe (bolted to flanges on either end), or it can be installed within a discharge pipe as a saddle connection. Spliced installations are common for new construction; saddle installations are common for retrofits. These meters are subject to clogging by debris in the water stream, a condition common to surface water supplies.

The placement of the meter is also important. Turbulence caused by elbows, valves, or other obstructions have negative impacts on the accuracy of the meter. Ideally, a meter should be installed 10 pipe diameters downstream from such obstructions, and four diameters upstream from the next change in direction. This condition rarely exists in the field, so the meter is placed in the best available place. Also, the pipe must be "full" for the meter to read accurately, since it assumes the full inside diameter of the pipe contains water when it passes the impeller. This condition is assured when the meter is installed in pressurized systems, but specialized plumbing is required for certain open discharge situations.

Another good use of a flowmeter is as a system performance-monitoring tool. When used with irrigation pumps, an abnormal increase or decrease in flow rate is the first indication of a pumping or distribution system problem. Decreases indicate plugging or increasing lift demands on the pump. An increase can indicate a break in the distribution piping.

Tracking well performance over the course of the year will allow a grower to determine if the decrease is seasonal or the sign of a serious problem. If combined with a totalizer, the flowmeter can become useful in a third application. The grower can now accurately determine the amount of water pumped and applied to a field and compare that amount to the crop's ET, thus determining irrigation efficiency.

Meters can be used as research tools as well. They can provide valuable data about water usage that can make the overall management of the region's groundwater supply possible. It is already known that overdraft conditions exist and systematic sampling has identified those areas that have been hit hardest. Extraction data will help create a groundwater model that can track changes over time, and suggest further areas of interest for recharge projects.

Winter Pump Testing

The time to evalutate your pump's performance it now, before another growing season begins. Testing now can define your worst case operating condition (greatest lift/lowest flow) before the groundwater recovery takes place.

Call the Associate Resource Analyst at the Kings River Conservation District, Eric Athorp, to schedule your appointment for a free pump test now!
CALL (559) 237-5567 extension 117.

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