



Evaluate the Performance of Your Irrigation System

Your irrigation system works most effectively when it distributes the right amount of water uniformly. This fact sheet explains how you can use an evaluation to determine if your system is performing as well as it can.

What's involved in an evaluation?

The main part of the evaluation is a field test of your irrigation system. With pressurized systems, trained Mobile Lab technicians will check the operation of your filters, and emitters or sprinklers. Pressures and flow rates are carefully measured throughout the field to determine how uniformly water is being applied to your crop. With this information along with observations made in the field, a report is generated that will be given to the grower when the evaluation is completed.

How long does it take?

The Mobile Lab technicians will need only a few minutes of your

time to answer some basic questions about your system. After that, the technicians will spend several hours performing a careful examination of your system. Additional time is then needed to compile the information and assemble a report. After the report is complete, the technicians will need a few more minutes of your time to meet with you and go over the results of the evaluation.

How much does it cost?

Thanks to support from local water districts, the North West Kern RCD can provide its Mobile Lab Services at a low cost to water users.

North West Kern Resource Conservation District

What does poor uniformity cost you?

Too Much! Poor uniformity means that your water bill is higher and your energy bill is higher. And, when water moves below the crop's root zone, the fertilizer moves too. This means that your fertilizer bill is higher also. Increased uniformity not only decreases costs, it increases your crop's growth, yield quality, and harvest profits.

How can you get your system evaluated?

Call the Irrigation Mobile Lab at (661) 281-2746 and ask for Brian.

Brian Hockett is the District Manager of the North West Kern RCD and the Mobile Lab team leader. He has been performing irrigation system evaluations since March of 1988. Brian graduated from UC Davis with a degree in Agricultural Science and Management.

Brian has attended the Irrigation Training and Research Center (ITRC) program at Cal Poly, San Luis Obispo. He and his team use a software program specially designed by Dr. Charles Burt at the Cal Poly ITRC.

To schedule an evaluation, call (661) 281-2746

You can also drop by the USDA Natural Resource Conservation Service office at 5080 California Ave. #150. Bakersfield, CA 93309.

Who Sponsors the Irrigation Mobile Lab?

The Irrigation Mobile Lab is sponsored and administered by the North West Kern Resource Conservation District. Partial funding is provided through these local agencies:

- Arvin-Edison WSD
- Belridge Water Storage District
- Buena Vista WSD
- Cawelo Water District
- Delano-Earlimart ID
- Kern-Tulare Water District
- Henry Miller Water District
- Kern Delta Water District
- Lost Hills Water District
- North Kern WSD
- Rosedale-Rio Bravo WSD
- Semitropic WSD
- Shafter-Wasco Irrigation District
- So. San Joaquin Municipal Utility District
- Wheeler Ridge-Maricopa WSD

The USDA Natural Resources Conservation Service is providing in-kind services for the Irrigation Mobile Lab by providing office space for the staff of the North West Kern Resource Conservation District and providing soil survey information useful to irrigation system evaluations. The NRCS also uses the evaluation within the context of their own Irrigation Water Management Program.

The Mobile Lab will test any kind of system. What are some potential uniformities?

Furrows.....	85%
Border Strips.....	85%
Hand-move sprinklers.....	75%
Solid Set Sprinklers.....	75%
Micro drip/Fanjet.....	90%

Kern County growers respond to irrigation system evaluations...

- "We have improved our linear system distribution from 67 percent to 85 percent. This is a direct result of recommendations from the Mobile Lab"
- "After I made the recommended changes to my drip system, the Lab returned to do a follow-up evaluation. The results of the follow-up showed an 11 percent increase in uniformity"
- "Results of the micro tests showed that uniformity and efficiency were up to 90 percent and 89 percent respectively, and the linear was at 90 percent and 96 percent respectively. This gives us a better idea of our operating status and how we can better manage our water."
- "The Mobile Lab came out and tested one of our flood-irrigated vineyards. It was an eye-opening experience to see how inefficient my irrigation practices were."
- "Brian (Hockett) has been very helpful in evaluating our drip systems, and has carefully explained and interpreted the findings to me."
- "As a result of their survey, I was able to see that with a little inexpensive maintenance, we could make better use of our water, get it where we need it and improve the fuel efficiency of our pumping engine."

Pre-Season Tune-up for Micro-Irrigation Systems

Micro-irrigation allows growers to precisely apply water and materials to their crops. Blocked emitters, punctured lines, and clogged filters, though, can be problems for micro-irrigation systems. To avoid trouble, plan to give your system a preseason tune-up each year.

Before you begin irrigating, you should prepare your micro-irrigation system for the new season. Many temporary repairs made last year will probably need attention.

Micro-irrigation systems are more than just a method to deliver water to the crop, they are a management tool. A properly designed and maintained system allows the grower to supply precise amounts of water, nutrients, and other materials to the crop.

If the system is used to apply fertilizers or chemicals, varying pressure problems will cause uneven distribution of materials throughout the field. These problems can be due to clogged filters, regulators, or emission devices. Also, problems such as leaking barbs, tubing, emitters and end plugs can allow water to collect at the base of the plant and invite disorders such as crown rot. Careful management and preseason maintenance can allow the grower to realize the full benefits of a micro-irrigation system.

PUMPS

A pump that has been sitting idle for a few months needs to be checked for rodent activity and nests that could cause a short in the windings. A thorough cleaning is important, especially for pumps operating in dusty conditions. A pump dealer or manufacturer will be able to provide specific instructions for the care of the pump and motor.

The oil levels should be checked and filled at this time, and turbine pumps with automatic oilers should be checked to see that they are functioning properly. After a long layoff, it is also a good idea to start the oiler 24 hours before a deep well pump is started. If you suspect that the efficiency of your pump has declined, a pump test is a quick and reliable way to assess its performance. Some utility companies offer this as a service – or check with your pump dealer.

FILTERS

Several items need to be checked on both screen and media filters prior to start-up. On filters that flush automatically, the controller and valves should be checked for proper operation.

If the controller is equipped with a pressure differential switch, the setting should be checked against the manufacturers specifications. A differential can be created by removing one of the leads to simulate a high differential. If the differential switch is operating correctly, this will initiate a flush cycle.

Minimum Flush Cycle. Some media filter manufacturers and dealers recommend a minimum flush cycle at two or three hour intervals to prevent fine contaminants from becoming embedded in the media even though the water may be relatively clean. The media filter should be opened to

inspect the level of sand in each filter. Ideally, the level should be the same in each filter. Any difference could indicate trouble, such as a faulty valve or problem with the filter cake or underdrain on filters so equipped. Also note the condition of the media itself. If the media is channeled or caked this could represent other problems, such as inadequate flush cycles during irrigation.

When setting the backflash time it is important to allow for travel time – the time required for the valve to move and fully seat. Most manufacturers recommend backflush times between 60 and 90 seconds.

After the filter and controller have been checked and repaired the backflush volume needs to be checked and adjusted. If the backflush volume is too high the result is a loss of media. If it is too low, this can result in improper cleaning.

Screen filters need to be opened and inspected also. The element, whether fabric, plastic, or steel needs to be inspected for damage. The conditions of the seals and O-Rings are important in isolating the incoming unfiltered water from the filtered water going to the system.

CHECK EQUIPMENT IN THE FIELD

Once the equipment that filters and delivers the water to the field has been checked and repaired, the drip lines, emitters, and peripheral equipment need to be inspected. A thorough flushing of the system is the priority, and this should be done in steps.

1. Flush the main line. Depending on the system and pump capabilities, it may be a good idea to close a portion of the system to increase the pressure and velocity. Find out what the safe maximum operating pressure is before flushing.

2. Flush tubing in the field. Hose ends are now opened and again, a portion of the laterals may be closed to ensure good pressure and velocity for the thorough flushing of the drip tubing. After the entire system has been flushed, the system needs to be checked line by line. One of the most efficient methods utilizes an irrigator walking and checking every row, wearing a cloth pouch like you would find in a lumber store. In it are emitters, couplings, punch, plugs, and hose ends to make the necessary repairs.

3. Measure pressure and flow. If the system is equipped with water meters, the flow can be compared with past years. A reduction in flow could indicate problems such as obstructed lines, emitters or micro-sprinklers, or partially closed valves. If it is determined that the emission devices have reduced flow rates, it could indicate a need for chemical treatment.

Another advantage of a meter is that it allows you to monitor actual applications as opposed to the time based irrigation.

For example, if your utility company offers off-peak rates you may be able to save on your power bill by irrigating at night. If the power is off for length of time you may not know that the field did not receive all the water you had scheduled without such a recording device.

- 1. Walk the field.** Check to see if there is a need for a second or third emitter at replant sites. Are there areas in the field where the tree growth is not what it should be? Spot checking pressures in weak or troubled areas may indicate changes are needed or further investigation.

SPEAK WITH YOUR IRRIGATORS

The people who do your irrigations are perhaps the most important link in getting water to your crop. A few short training sessions can help to familiarize the crew with equipment, eliminate misunderstandings, and build a sense of teamwork.

This newsletter was provided by Greg Jorgensen from the Center for Irrigation Technology, California State University, Fresno.

In order to ensure that your system is operating efficiently, contact Brian Hockett at (661) 281-2746 to have the Mobile Lab come out to your farm and perform an evaluation of your irrigation system.