

The Las Virgenes Municipal Water District's **Sprinkler System Tune-Up Tutorial**

The thought that improving your irrigation system's performance and creating better soil conditions for your plants can result in a healthier garden that uses less water is true. But, all of that potential for lower water use is quickly and easily lost when we do not pay attention to system management. We need both uniform water distribution and a reasonable watering schedule to be efficient.

IRRIGATION EFFICIENCY = DISTRIBUTION UNIFORMITY + SCHEDULING

What does this mean? Well, in order to be 100% efficient in our irrigation, our systems must apply water evenly across the landscape just as if rain is falling, and we must develop an irrigation schedule which replaces water in the same quantity and at the same time as it is lost to evaporation and plant water demand.

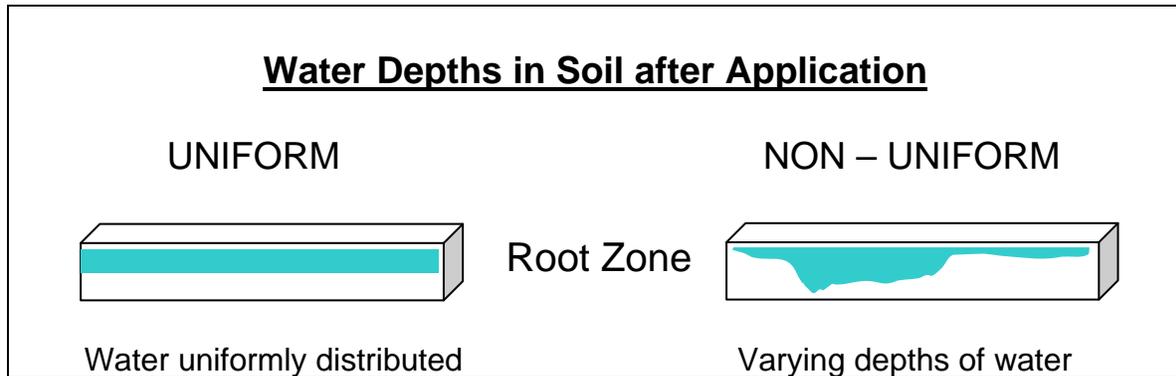
Inspecting the operation of our irrigation system is the important first step that leads to improvement in the uniformity of irrigation water distribution. After we identify system deficiencies, we can address them. If we follow this with up by developing and implementing an irrigation schedule that puts back into the soil that amount of water the plants have used, we have become efficient irrigators. That's it! It's actually quite simple.

Now, realistically, we will never achieve 100% efficiency. But as we approach it, we will realize an improvement in our garden's health and appearance, a lower incidence of disease and pest problems, reduced maintenance time, and reduced maintenance costs.

Improving irrigation efficiency is a three step process:

1. Identify irrigation system performance problems. Use the information contained in this packet to develop an understanding of what these problems look like and to record if and where they exist in your irrigation system.
2. Correct the problems. Armed with this knowledge, you can either correct the problems yourself or know how to direct the work of someone you hire.
3. Manage your watering times. Now that everything is in good repair, it is time to set your irrigation controller to apply the correct amount of water. The LVMWD Simple Irrigation Scheduler will get you started. You may even find that you can further reduce your sprinkler runtimes after having used this starter schedule for a few weeks.

IRRIGATION UNIFORMITY



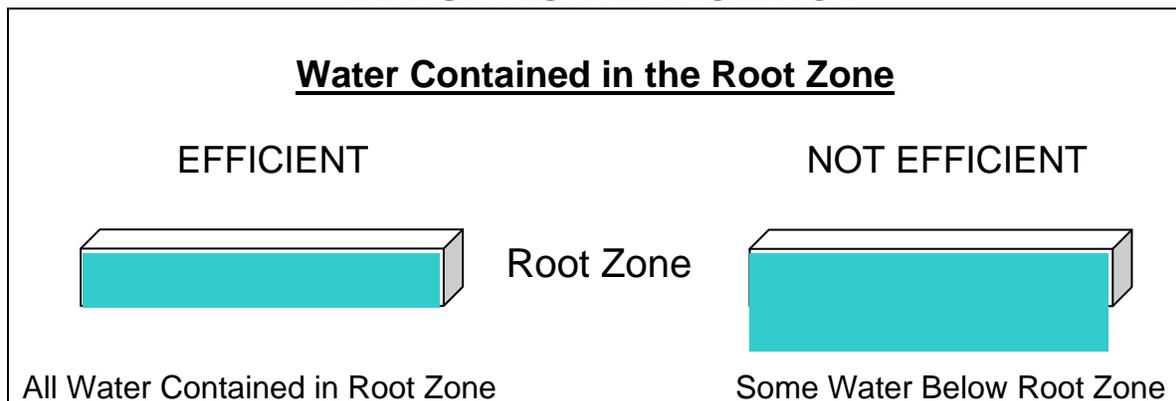
IRRIGATION SYSTEM EFFICIENCY

While they are related, the concepts of uniformity and efficiency are quite different. It is possible for a system to have high uniformity and low efficiency or low uniformity and high efficiency. The ideal, of course, is to have both high uniformity (giving good appearance) and high efficiency (minimum cost).

The figure below illustrates that irrigation efficiency is a measure of the amount of water stored in the root zone divided by the amount of water applied during an irrigation.

Uniformity is primarily related to the system's mechanical performance, while efficiency is a measure of both the equipment and the management at a site.

IRRIGATION EFFICIENCY



IRRIGATION SYSTEM CONCERNS

The following information will help identify weaknesses that may exist in your irrigation system which contribute to non-uniformity, so they can be addressed.

BROKEN VALVES

A leaking irrigation valve can be a major source of water loss. Check for loose screws, faulty washers and worn gaskets.

BROKEN HEADS

Obviously a broken head will not perform up to the manufacturer's specifications. Look for water leaking from the seal around the pop-up stem when that section of the system is operating, as well as for any other visible leaks.

MIXED HEADS

Our goal is to apply our water uniformly across the landscape. The sprinkler head and its nozzle are responsible for doing this. Because there are so many brands of irrigation equipment, each with their own characteristics, the easiest way to be certain of a standard performance throughout the system is to keep to one manufacturer and style.

MIXED NOZZLES

Even when you stay with one manufacturer, you must keep on your toes. Most sprinkler heads come with interchangeable nozzles, and different nozzles can have different precipitation rates. Precipitation rate is another way of saying how much water is being applied, and is measured in inches per hour (in/hr) just like rainfall. If you mix nozzles in a zone, an area serviced by one valve, you can end up with one part of the zone receiving less water than another, or non-uniformity. This is why it is so critical to pay attention to a nozzle's precipitation rate and the area it will cover. Information on nozzles and their precipitation rates can be found in the manufacturer's catalogs.

IMPROPER SPACING

Spacing is important because it too affects precipitation rate. Irrigation systems should spray water from one head to the next for best performance. Proper spacing is critical to uniform water distribution.

HIGH PRESSURE

High pressure results in excessive fogging as water is forced too quickly through the nozzle. This fog tends to drift away from the area you are trying to irrigate. Unless you can install a pressure regulator for the entire system, the best remedy is to retrofit each of the nozzles with their own, in-head pressure-regulating device. These devices are available from certain manufacturers for some of their equipment lines. These mechanisms will ensure the proper operating pressure at the nozzle and eliminate any differences in pressure from one nozzle to the next. If these are not available for your equipment, you can reduce the pressure to the nozzles by another means. Locate the valve which services the zone with the high pressure problem and turn the flow control, generally an X-shaped handle on the top of the valve, in a clockwise direction until you see the majority of the mist disappear. Be careful not to turn it down too far, you do not want to sacrifice coverage. Try to strike a balance, eliminate as much fog as possible but ensure that each head is throwing water to its neighboring heads.

LOW PRESSURE

Low pressure moves too little water through the sprinkler head and results in non-uniformity. Make sure any regulators are operating properly, and that the valves are not closed down. If the valves and regulators are working properly, this condition might possibly be corrected through the use of nozzles with a lower precipitation rate. If this is not feasible due to the distance between the heads, the area may have to be sub-divided and serviced by one or more additional valves.

MISALIGNED HEADS

Easily corrected. Sometimes heads or nozzles get turned so they are spraying in the wrong direction. A periodic check of the system will reveal any misaligned heads.

BLOCKED HEADS

As a landscape matures, plant materials sometimes grow up and block some of the water from the sprinkler heads. In shrub areas it is not always a problem, as these plants often have far reaching root systems allowing them to find water in other areas. Turf, however, is not as forgiving. Because a lawn is composed of millions of tiny plants with limited root systems, it requires water to be delivered to virtually every square inch of surface area. You may find it necessary to trim

or remove plants or to relocate heads in order to ensure proper coverage.

SUNKEN HEADS

On the day before the lawn gets cut, check to see if the sprinkler heads in the turf areas are popping up high enough not to be blocked by tall blades of grass. If there is interference, change the riser pipe connecting the head to the underground system so the nozzle pops up high enough to clear the turf. Be careful not to raise it so high that it may catch on the blade of the mower or possibly cause someone to trip. If the adjustment cannot be made, trim the grass around the head a bit lower with either a string trimmer or grass shears.

TILTED HEADS

Sprinkler heads are designed to throw water in a prescribed pattern from the nozzle. This pattern can only be achieved if the top of the head is parallel to, or level with, the ground. Heads which are not level will not be able to spray the irrigation water as far as desired, or in the desired pattern.

PLUGGED NOZZLES

More and more, manufacturers of irrigation equipment are incorporating screen filters into the design of their sprinkler heads. But even with these filters, nozzles can become plugged, interfering with the proper distribution of water. Although this generally occurs only when there is a break in the line or a repair has been made, periodic inspection, and cleaning as needed, is suggested.

OVERSPRAY

A properly designed system will have minimal overspray. Some overspray is inevitable when irrigated areas are free-form in shape. However, minimizing this loss of water is important to system efficiency. Adjustment can be made through the use of the adjustment screw on the nozzle, use of different nozzles, or adjustment of flow at the valve, depending upon the situation.

INCORRECT ARC

This is sort of a given, but for some reason this problem persists. A quick check to ensure the nozzles have the proper spray pattern (quarter circle, half circle, etc.), no matter who made the installation or repair, is always worthwhile.

LOW HEAD DRAINAGE

When an irrigation valve is turned off, it stops any water from entering that part of the system that is downstream of it. There is, however, some water that has already passed by the valve but has not yet left the pipe through the sprinkler head. This water is no longer under pressure and will remain in the line if the heads are all on the same level as the valve. If they are not, this water will drain out of those heads that are lower than the valve. This will result in a constantly wet area around the lowest head, possibly a minor erosion problem, repeated loss of residual water in the line, and sometimes a slippery walkway. This situation can be effectively remedied through the use of check valves.

WEEPING HEADS

If you observe that one or more heads are consistently emitting a very small amount of water, the problem is something other than low head drainage. The problem lies with the valve for that zone. The constant flow is a result of the valve's failure to close fully and may be due to debris that has become lodged inside, or from worn parts.

Need Help? Call the District and ask to schedule a Water Use Efficiency Survey and a District staff person will assist you in evaluating your irrigation system and developing an irrigation schedule.

IRRIGATION SYSTEM FIELD TEST

CONCERNS																	
STATION	BROKEN VALVE	BROKEN PIPE	BROKEN HEAD	HIGH PRESSURE MIST	LOW PRESSURE	CHECK SPACING	OVERSPRAY	PLUGGED NOZZLES	BLOCKED HEADS	SUNKEN HEADS	TILTED HEADS	MISALIGNED HEADS	WRONG ARC	MIXED HEADS	MIXED NOZZLES	LOW HEADS DRAIN	
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