RECOGNIZING AND TREATING DRAINAGE PROBLEMS

BY **LUKE FRANK**

Weather is fickle, which to most people means it's hard to plan recreational activities. But to a turf manager, it can be a matter of professional life and death. And just as you adjust your management practices for occasional drought, you also must prepare for deluges and even 100-year floods.

Managing a turf site revolves largely around controlling the location of water, be it irrigation or natural precipitation. In fact, oftentimes the two are indistinguishable. If you have drainage problems, one of the first places to investigate is your irrigation system, irrigation scheduling, and cultural practices.

Drainage impostor

Not all drainage problems require drainage systems. Many saturation issues stem from poor irrigation coverage, excessive thatch accumulation, soil compaction created by heavy equipment traffic or sodium buildup, and clay or muck soils with poor hydraulic conductivity.

Even the best irrigation system design cannot deliver 100-percent uniformity. In many cases, a turf manager is lucky to deliver water at 60-percent efficiency rate. That translates to extra watering to provide sufficient moisture to the driest areas of the site.

Poor irrigation performance never should be ignored when investigating a drainage problem. However, if you have about as good a system as you're going to get and there are still drainage problems, consider a few basic turf cultural practices before installing a drainage system.

Drainage problems can be the result of water held above the soil surface by an accumulation of thatch. While some thatch encourages surface resiliency, excessive thatch can lead to serious drainage problems. In general, more than half an inch of thatch accumulation can lead to percolation and runoff issues. In those cases, aerification is the drainage solution.

Poor drainage can be a disaster. What is the root cause of drainage problems? Clearly it depends on the site. The answer to most drainage problems is to install a

herringbone or gridiron system of artificial drainage tubing. Sounds simple, right? You dig the trenches, lay the tubing, backfill the trenches and relax in the shade with a tall, cold glass of lemonade.

Installing drainage systems is a skill few turf managers can master. The first step is not digging the trench. You first must carefully consider the environment and where the water will be diverted. Will it be "contaminated" with fertilizers or pesticides? If so, would it be appropriate to place the outlet of the drainage system on the bank of a pristine waterway?

Ideally, the drainage outlet should be located to place excess flows into an irrigation reservoir, so the water would eventually be pumped back onto the playing surface, where nutrients and pesticides are absorbed or filtered by the turfgrass ecosystem.

The next step is to survey the area and stake the proposed drainage system. Many drainage systems are useless the day they are installed because the mainline runs uphill or across an even grade. Furthermore, if the drainage system must intercept underground water or seepage, stake the drainage system so that the laterals of the herringbone or gridiron run perpendicular to the direction of water flow.

During the staking process, remember also to include several clean-cut openings for the drainage system. These openings will prove invaluable as years pass, providing easy access to the underground drainage tubing when problems develop from tree-root intrusion or silt accumulation.

Now it's time to dig the trenches, but how deep and wide should they be? Most managers recommend digging trenches 6-8 inches wide and 18-24 inches deep, which conveniently match the dimension of most mechanical trenchers and allow standard 4-inch-diameter tubing to be easily placed in the bottom of the trench.

Drainage tubing comes in many shapes and sizes. It also comes with or without a fabric liner. The most popular form of drainage tubing is the 4-inch-diameter, flexible perforated pipe. It's flexible and can transport large volumes of water in a reasonable amount of time. And, down the road, it can easily be accessed to clear away clogs.

Before laying the tubing in the trench, ensure the bottom of the trench is covered with 1-2 inches of gravel, to prevent the tubing from resting on the soil and becoming loaded with silt and clay. Double-check the slope of the trenches. To ensure adequate water movement, each trench should have a minimum slope of .5 percent. Generally, a slope of 2 percent will facilitate good movement.

After the drainage tubing has been set, it's important to anchor it in place by carefully pouring additional gravel on both sides, again to prevent the tubing from becoming plugged with silt and clay.

Best backfilling practices

Once the drainage tubing has been anchored, determine whether to backfill the trenches all the way to the surface with pea gravel. If pea gravel is not accessible and larger gravel must be used, the last 2-4 inches of the trenches should be filled with coarse sand.

Your site and practices may lend themselves to backfilling with quality topdressing sand and organic matter, but pure sand should be avoided to prevent rapid turf wilting on top of the trenches.

When filling the trenches all the way to the surface with pea gravel, install a cover over the top where possible to keep loose material in place. If the material is not held in place, it can damage expensive mowing equipment. Choose a cover material that provides support for the turf as it grows over the top of the trenches.

It is always better to leave the trenches open to the surface so that water will quickly enter the drainage system. Sod over the surface of drainage trenches can prevent water from entering the system. When sodding, install numerous surface drain inlets to ensure surface water will enter the drainage system. To keep debris and small animals from clogging the drainage system, cover each surface drainage inlet with plastic grates, where possible.

As a final note on drainage tubing installation, always remember that good housekeeping is the sign of a conscientious worker. When drainage work is being done, the soil removed from the trenches should be placed on plywood or plastic, or into a waiting vehicle.

After the drainage system is installed, the work site should be carefully raked to remove all remaining debris. If sod is replaced on the top of the trenches, make sure it is level with the surrounding area to prevent subsequent mower scalping. Remember that new sod requires additional watering for the first few days of establishment to prevent wilting.

As with any major project on your site, ensure that your equipment, plant material and soil are in optimal condition before embarking on an intensive, intrusive procedure like installing a drainage system. Otherwise you're spending money and disrupting the site to address symptoms and not the real problem. ST

Luke Frank is a veteran writer on irrigation subjects. He can be reached at lukefrank@earthlink.net.