

Landscaping

Irrigation: What You Don't Know May Be Hurting Your Landscape

by Diana Lomont

When one hears the word irrigation, the thought of watering lawns comes to mind. Be it sprinklers that spray water, or tubes that drip it, the

purpose of irrigation equipment is to keep plants green and healthy.

Too often, however, a property's landscape is not receiving the correct

amount of water. Skimping on water can starve plants, while too much can drown their roots, attract fungi and diseases, and contribute to soil erosion.

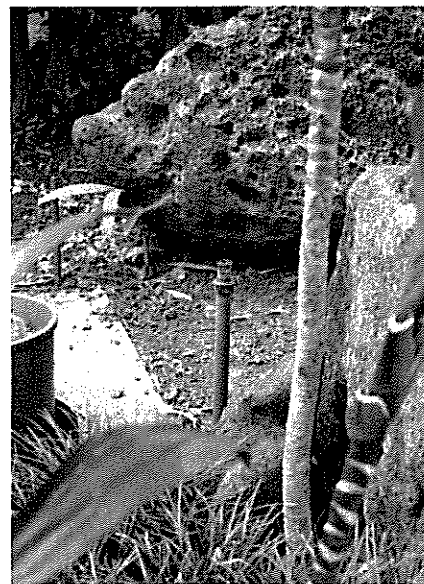
Landscape contractor Kevin Mulkern has found that irrigation inadequacies often result when water pressure and volume are too low, the pipes are too small and the sprinkler heads are spaced too far apart.

"You equate it to a mathematical equation," said Mulkern's wife and partner, Susan. "If you don't follow the equation then it's not going to work, or you're going to get very poor results."



Kevin Mulkern

When installing an irrigation system, electrical ground wires should run along piping for easier access.



The less expensive riser sprinkler heads may be safely used in tight areas where people are unlikely to walk.



A major problem in automatic sprinkler systems is corrosion at wire connection points. To prevent this, waterproof connections should be used.

Problems with an irrigation system can usually be traced to its design, said Mulkern.

For example, a cost-cutting landscape architect may specify sprinkler heads to be spaced farther apart than recommended. Heads arranged to provide a 50 percent overlap, instead of 100 percent, will reduce installation costs and may water all areas under ideal conditions. "But in reality it doesn't work that way," said Mulkern. "There's wind, and trees grow big and block the spray."

Landscape architect and contractor Greg Boyer has seen plants suffer because of economizing measures

taken in irrigation systems. Sometimes sprinkler heads to water lawns and shrubs are put on the same water circuit. Because lawns and shrubs have different watering needs, Boyer noted, "that doesn't allow you to take care of those plants' individual needs separately so that you can put them both in the optimum."

Irrigation consultant Allan Schildknecht, president of Irrigation Hawaii, says these problems persist because building management personnel often don't fully understand their systems.

"People just try to overtax the source of their water," noted Schildknecht. "When we are called back later to do some water management surveys on a project, it's just impossible to do much because the systems were taxed initially."

Improving Irrigation

There are ways to improve water distribution. The first step is for a property manager to ask a landscape designer or irrigation specialist to conduct a survey of the project's water usage and plant health. Mulkern suggests reviewing the original design plans to find out what the equipment was designed to handle.

A landscape professional will examine such questions as:

- Is the water usage efficient in proportion to the area covered?
- Are the water pressure and volume sufficient to irrigate the grounds well?
- Is the water pressure at the first sprinkler on a circuit much stronger

than at the farthest sprinkler?

- Is the water applied proportionately to the soil's percolation rate? Or is there water runoff and soil erosion?
- Are trees or large shrubs blocking the spray of water?
- Are the sprinkler heads properly placed to provide even watering?
- Do any sprinklers spray water on sidewalks or against the building?

Once these questions are answered, there are several steps a landscape contractor can take to correct an irrigation problem. Expense, of course, is a building manager's primary consideration. The last thing one wants to do is dig out existing piping and install new, bigger piping.

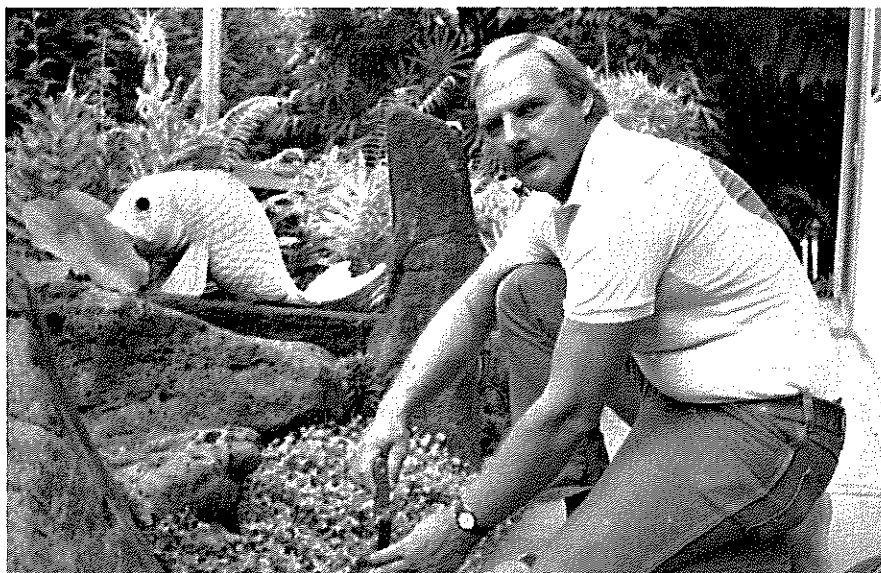
A landscape manager may think that the easiest way to expand a system's water coverage is by adding sprinkler heads. But Mulkern advises against such action without careful study.

When water coverage is inadequate, adding sprinkler heads is not necessarily the solution.

"Adding heads is one of the worst things one can do. It requires a lot of thought. If the system was designed for 30 gallons a minute and it's not working because it only has 20 gallons a minute, adding two additional heads will make the situation worse," Mulkern asserted.



This sprinkler was causing water damage to the building because it had a full-circle head. It was replaced with a half-circle head.



Greg Boyer demonstrates how a pop-up head rises from a flush mount position for safety.

Problems with an irrigation system can usually be traced to its design.

To ameliorate poor water coverage, sometimes piping circuits must be divided, or new circuits added. Only when a sufficient water source exists should one think of adding sprinkler heads.

If a water supply must be stretched to cover an area, devices are available to help conserve water. For example, a system's existing sprinkler heads can be replaced with low gallonage heads, or water-conserving nozzles can be fitted onto some heads at a cost of \$2 or \$3 apiece.

Schildknecht recommends installing valve checks to keep water from seeping out of a system's low heads when the water is shut off.

"You often see water running across the sidewalk for maybe an hour after the sprinklers have been turned off because these pipe systems hold a

tremendous amount of water that's wasted every time," Schildknecht noted.

If an irrigation system cannot provide the amount of water coverage needed, there are other options, added Mulkern. A landscape's design could be altered to incorporate decorative rocks.

Or, if improvements to the irrigation system are too costly, a property manager could resort to having a groundskeeper hand-water an area with a hose.

"You have to examine your options to see what's most feasible for your particular project," said Mulkern.

Proper Watering

How much to water plants is a question that has no simple answer. Different plants have different water appetites, and it's essential to know what's best for each. An irrigation consultant or knowledgeable landscape designer can provide watering tips for specific plants.

One watering problem Schildknecht often sees is too much water

too soon. The typical sprinkler head discharges 1½ to 2 ins of water per hour. "That rate is probably three times as great as the percolation rate of soils, except on a sandy beach," he said.

Proper plant watering requires knowing the evapo/transpiration rates—the average evaporation rate of a particular area and the transpiration rate of a given plant. Then, by measuring the daily rainfall of an area with rain gauges, a groundskeeper can apply the right amount of water.

An easier rule of thumb is to keep tabs on the weather and keep an eye on the plants and their soil condition, to make sure they get enough water but not more than they can handle. One way an irrigation system can suit a plant's needs better is by watering longer with a lower water pressure. This gives the soil a better chance to absorb the water.

For those who can afford it, a sophisticated, computerized irrigation controller offers more advanced capabilities than the basic electromagnetic clock controller. With the solid-

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state controller, a landscape manager can program different watering schedules for individual watering circuits to meet varying needs of plant areas.

Computerized controls also allow repeat watering cycles, or variable cycles that can skip days. For large projects, such as the Kauai Westin, the computerized controllers can hook up to weather stations that measure the amount of wind and rain. The

Watering longer with lower pressure gives the soil a better chance to absorb the water.

watering schedule is automatically adjusted to compensate for those conditions.

However, landscape professionals recommend these computerized controllers only for projects where the operator will know how to work the system.

"All too often, the control of the irrigation system is left up to somebody who does not fully understand it," said Schildknecht. He noted that there are "hybrid" controllers that offer some of the scheduling options of the computerized controllers while still allowing the operator to dial in the times.

Boyer, who installs primarily residential landscapes, still prefers the "tried and true" electronic clock controllers. Several years ago, he began installing the computerized controllers, but so many malfunctioned that he ended up taking them all out and replacing them with clocks. He added, however, that the newer, more advanced systems may be better if they have electrical surge protection and reliable battery backup or permanent memory.

Reliable Equipment

Irrigation systems supply water through two basic forms: sprinkler heads and drip irrigation tubes. Landscape professionals recommend using sprinklers for the majority of watering needs.

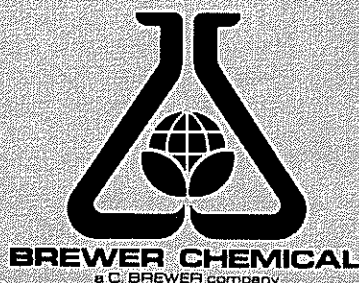
Sprinklers are available in various types of stand-up riser heads or pop-up heads that utilize springs to pop out of a flush-mount ground position. Pop-up heads are now being made to extend 12 ins. and, with an extension, up to 18 ins.

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Although the pop-up heads are more expensive than the riser sprinklers, Boyer says they are worth the extra cost for several reasons. For one, they stay out of sight, and therefore, out of harm's way.

"It's not only vandalism; it's people walking along and tripping over them or backing up over them when trimming hedges," remarked Boyer. (However, he added that the risers may be safely used in tight areas where it's unlikely people will walk.)

Pop-up heads are also easier to

If you install computerized controls, be sure your staff knows how to use them.

repair if they do break, said Boyer. Their parts can be disassembled without disturbing the piping system.

The riser sprinklers, on the other hand, usually break at their base in the ground. When one digs it out and unscrews it, dirt can fall into the pipe.

The problem is compounded when the water is turned on; the dirt flows downstream and clogs the other sprinkler heads.

There are many types and makes of sprinkler heads available that spray water in a full circle, half circle, or quarter circle. Mulkern prefers the plastic pop-up heads to the metal ones because they resist corrosion. They also have filtration screens that prevent clogging and nozzles that are easily adjustable.

Most landscape professionals re-

Saving Water with Less Thirsty

*From Koko Head to
Halawa Valley*

No matter which expert you consult, the prediction is the same: A water shortage is in the cards for Hawaii's future.

In Hawaii, where planted landscaping is dominated by water-hungry tropical foliage, that's bad news. "A lot of the things that we're growing now will require more water than we can afford to give them," said Paul Weissich, director of the city and county of Honolulu's Foster Botanical Gardens.

Now is the time for building managers responsible for landscaping maintenance to think about that day of reckoning, say Weissich and other local landscaping and botanical specialists.

Foster Gardens is already preparing for it. At an experimental project at Koko Head Crater Park, some 1,000 species of drought-tolerant plants are being grown under Weissich's direction with minimal irrigation.

The Koko Head Project

The motive is to develop a selection of plants that are both attractive and less thirsty. "We're going to have to go in for a less lush tropical look," Weissich explained.

Eligible candidates for drought-resistant plants must have no thorns, spines or poisonous sap. Many of the plants that fit that description are exotics that lack color and abundant flora. Weissich said Foster Gardens is trying to hybridize some of these dry-climate plants with their colorful lush relatives growing in Hawaii.

For example, some plumeria trees

grow in Baja California, Mexico with five inches of rain a year. In the Andes in South America, bougainvillea keeps its leaves and flower with only five inches of annual rain. There are anthuriums from southern Mexico that also survive well in very dry conditions.

None of these plants are particularly striking in appearance, but they can be hybridized successfully, plant owners may be able to enjoy the best of both worlds: eye appealing specimens that require less water.

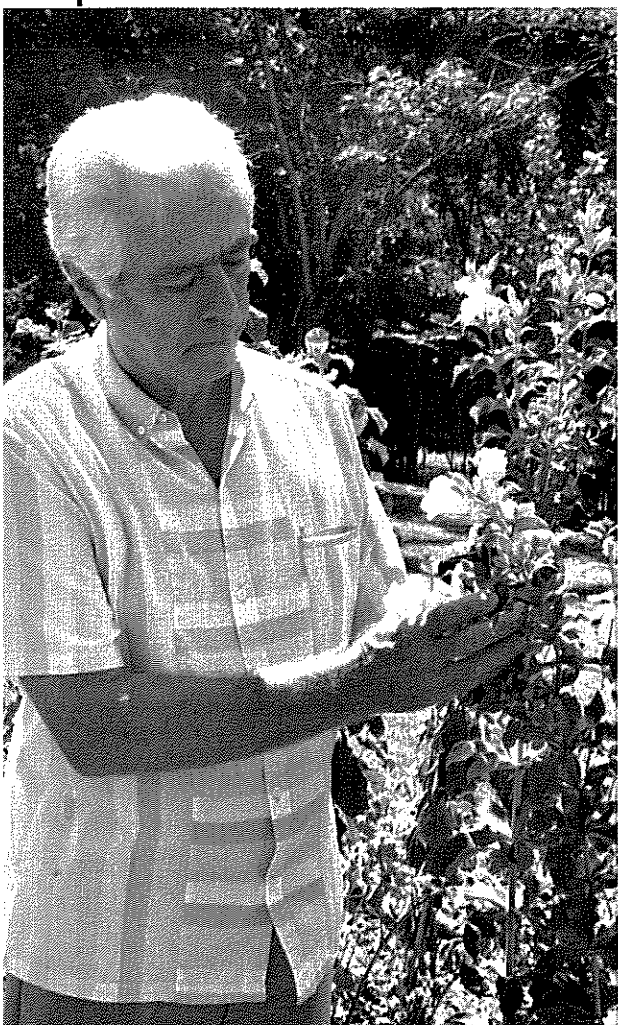
Some indigenous Hawaiian plant may also be suitable candidates for dryland ornamental use. Foster Gardens is working at developing thornless kiawe tree. Kiawe is an extremely drought-tolerant plant that grows in poor soil and dry climate, but is normally shunned because of its thorns.

"I think that the old junk tree kiawe can be turned into a highly valuable tree," Weissich said.

The irrigation system in Koko Head Crater is a "very primitive form of drip irrigation using heavy plastic tubing which is perforated to supply water to individual plants," Weissich explained.

"It conserves a lot of water, puts the water just where you need it; you're not watering an acre of ground just to take care of one specimen," he said.

"However, no matter what kind of plant it is - drought-resistant or not - you still have to establish the pot thing. You can't stick it in a dry hole in the ground and walk away from it; you'll kill it."



Paul Weissich inspects a kiawe tree Foster Gardens is trying to develop without thorns.

commend using sprinkler heads that spray larger drops of water. The finer the mist, the easier it can be carried by the wind.

"I find that's really important in Hawaii because we have winds all the time," noted Boyer.

Apart from sprinklers, drip irrigation is normally reserved for planter boxes where spray would reach the surrounding building. Drip irrigation usually requires more maintenance because of emitter tubes losing their connections or becoming clogged.

Boyer uses porous rubber pipe called Leaky Pipe® to irrigate planter boxes. The pipe is filled with tiny holes that perspire water to provide gradual watering beneath the soil.

"Everybody's sort of afraid of the little holes plugging up. But I've found that there's no trouble with it yet," said Boyer. "Everywhere I've used it people have been satisfied with it. I've never had malfunctions with it."

There is other equipment to be concerned with: plastic valves versus brass. Boyer prefers the strong plastic

valves because they resist corrosion. However, he said that brass valves should be used for high water pressures.

Whatever equipment you may need for your irrigation system, Mulkern, Schildknecht and Boyer all advise consulting an irrigation specialist or landscape architect. A contractor may offer an attractive bid, but without knowing what's going into your landscape, you may end up paying more in the long run for maintenance or replacement of equipment. □

Plants

The Xeroscape: Dry Landscaping

Meanwhile, in a separate project the Honolulu Board of Water Supply (BWS) is establishing a collection of drought-resistant plants in Halawa Valley.

Tak Ueda, a BWS landscape architect, explained that the board had for several years been looking for an appropriate site to demonstrate attractive landscaping utilizing water conservation with less thirsty plants.

When Ed Doty, president of Eagle Distributors Inc., donated \$50,000 to establish the park behind his business's headquarters on Iwaena street, the state agency jumped at the chance. It took a lot of work to turn the former site of dry shrubs and junked cars into what BWS dubbed the Halawa Xeroscape Garden.

Started one year ago, planting in the small park is now complete, with an irrigation system in place to water more than 80 young dryland plants.

The automatic, electronically controlled irrigation system includes six tensiometers that sense the amount of moisture in the ground. If enough rain has fallen, the tensiometers will keep the preset clock from activating the valves to release water. In addition, a rain sensor attached to a pole records the amount of rain received.

The irrigation system consists of polyethylene tubes that supply the water, which is released by different devices according to the amount of coverage desired. Tube emitters



Tak Ueda, landscape architect for the Board of Water Supply, says the dryland plants at Halawa Xeroscape Garden will consume less water once they are established.

provide drip irrigation at the rate of one half gallon per hour to individual plants, and microspray heads spray a small amount of water. Larger areas are watered with regular spray heads, impact heads and pop-up rotors that provide water at a rate of five gallons per minute.

Watering amounts will be reduced once the plants are established, after about a year.

The less thirsty plants on display include the following trees: wiliwili, poinciana, plumeria, bombax, autograph, leopard, opiuma, pink tecoma, silver trumpet and pride of India. The garden's dry climate shrubs include desert rose, ulei, lantana, plubago, palmer's banyan and naupaka. Bougainvillea and cape honeysuckle are two vines in the project.

Drought-tolerant grasses include St. Augustine, papulum and zoysia.

Ueda said the plants are fertilized depending on need, as frequently as every three or four months. Pre-emergent herbicide is used every six months to prevent weeds from taking root.

The garden's soil is amended with black sand and bagasse. Mulching materials to be used as water-conserving ground cover are displayed in landscaped sections of the grounds; they include gravel, cinder bark and river rock.

The park will be open to the public next spring to correspond with the reopening of the Board of Water Supply's incline shaft tour into Halawa Valley.

— by Diana Lomont