Editorial Focus: Irrigation & Pump stations

# Improve irrigation system now to beat next drought

By DAVID D. DAVIS

While rainfall at the right time solves many irrigation problems, recent weather patterns have brought drought to large portions of the country.

Under drought conditions, a system designed and maintained to handle an arid climate might not require too many tweaks to improve efficiency. A system designed to supplement rainfall, on the other hand, may require substantial tweaks and/or upgrades, just to survive a short drought. A prolonged or multiple-year drought could lead to severe turf damage and perhaps complete replacement of the irrigation system.

Even if your golf course and irrigation systems will not face droughts, you will face years of reduced rainfall, reduced humidity and increased temperatures, all of which increases irrigation requirements and stresses on your total system.

In either case, there are several steps you can take to improve your irrigation system. First, actually evaluate your system.

**ITEMS TO TRACK AND EVALUATE INCLUDE:**

• Power and water consumption – increases over a period of time indicate system wear and probably loss of efficient coverage.

• Sprinkler repair costs – increases year after year indicate excessive wear with definite loss of operating efficiencies. This includes power and control wire failure, broken sprinklers and worn nozzles.

• The number of extra people it takes to hand-water hot spots or work on correcting coverage problems increases each season, regardless of weather conditions.

• Increasing frequency of pump station repair, including accessory equipment, generally indicates loss of pressure and flow.

• Length of time to complete irrigation programs and schedules – increases in schedule length can indicate many problems, including pump and sprinkler wear, inadequate mainline sizes and reduced efficiencies of control systems.

**IMMEDIATE ACTIONS COURSES CAN TAKE INCLUDE:**

• Audit critical areas of the golf course for coverage efficiencies. Check sprinkler spacing, flow and nozzle pressure.

• Develop a preventive maintenance program to meet your normal irrigation needs as well as drought conditions. This should include nozzle replacement to match coverage requirements and a pump station tune-up, including motors, pumps, filters, etc. In addition, tune-up mainline and lateral isolation valves, make sure all valves are fully open, check controller programs and schedules for balanced flow and pressure relationship.

• Develop a short-term drought-management plan. Consider what you have to do to survive a drought. This should include repair of system components and identification of supplemental water sources. The plan should also include identification of turf and ornamental areas, which can survive on reduced or "deficit" irrigation.

When short-term actions do not increase irrigation efficiency, renovation or outright replacement of irrigation system should be planned.

**RENOVATION AND/OR REPLACEMENT PLANS SHOULD INCLUDE:**

• Use of valve-in-head sprinklers having low scheduling coefficients and high distribution uniformity coefficients.

• A weather station to develop real-time site data to facilitate sprinkler programming and scheduling

• A state-of-the-art central control system and field controllers. Central control should be capable of monitoring pumps, filters, weather station, flow meters, etc.

• Use of properly sized mainlines to minimize excessive pressure losses and energy costs.

• High-efficiency pump stations including high-efficiency motors, pumps, filters, valves and piping to reduce cost of operation.

• Use of high-efficiency flow metering equipment on pump station and/or water source point of connection to accurately measure quantities of water delivered.

• Develop a long-term drought-management plan which incorporates area separations by feature, specific site location, plant material, irrigation requirement or environmental exposure to facilitate various levels of reduced irrigation.

• Create GPS record plans to provide a more accurate map of equipment, mow lines and features (see related story on page 1).

These steps taken to improve system efficiency can reduce operating costs and improve playability even during droughts. An efficient irrigation system also reduces the stress on superintendents.

*David D. Davis is the president of the irrigation consulting firm David D. Davis & Associates in Arrowhead Highlands, Calif.*

## GOLF COURSE NEWS POLL

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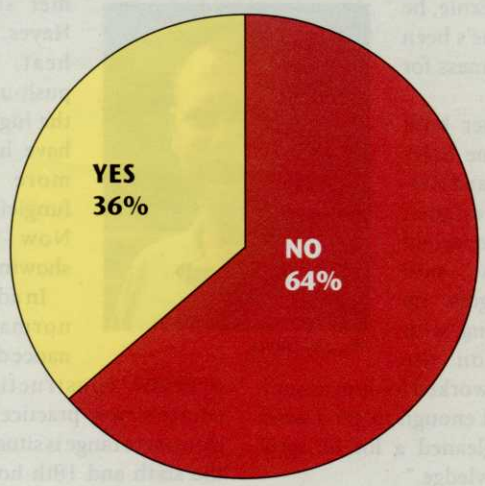
***Will your course be improving its irrigation system for next season?***




**Our irrigation system is currently state-of-the-art, fully computerized, valve-in-head, weather station integrated, and is pressurized by a new Watertronics VFD pump station. We are currently as efficient as possible and do not need any upgrades.**
*— Matt Cyrus, partner, Aspen Lakes Golf Course*

**We will be upgrading our front-nine fairway irrigation by adding new heads and possibly adding satellite controllers and connecting them to our central controller. This work is more toward integrating front-nine fairways into our existing automated system, which covers all greens and tees and back-nine fairways.**
*— Jeff Normandt, superintendent/owner, Valley High Golf Club*

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# Pump stations become more robust to handle 'aggressive' water

By ANDREW OVERBECK

As use regulations continue to push the water quality envelope, pump station manufacturers are working to keep pace with systems to handle so-called aggressive water. Flowtronex, Syncroflo and Watertronics all have devised systems that can withstand everything from brackish water to tertiary effluent.

Flowtronex created its first brackish water system constructed largely with stainless steel for the Old Collier Golf Club in Naples, Fla., two years ago. In order to get approval for the golf course, developers had to agree to use water from an adjacent semi-brackish river and a well that yields mostly brackish water.

"We never thought that anyone could grow grass with salt water," said Flowtronex's Tom Male. "Well, with paspalum you can, so we created a system that could handle the salt water." Since the Old Collier installation, the company has sold five more of the heavy-duty systems.


*Old Collier GC in Naples, Fla., irrigates with brackish water.*

Old Collier superintendent Tim Hiers uses the different water sources depending on what time of year it is.

"From June to October, the river has lower salinity because of the rain we are getting, so we pump largely from the river," said Hiers. "But from November to May, it can be pure ocean water so we rely on our deep well."

The deep well averages 5,200 tds and the river can range upward of 34,500 tds.

The resulting pump system features stainless steel columns and pipes, and the discharge manifold, pump head and internal fusion are bonded with epoxy. The valves have stainless steel disks and the bells and impellers are made of cast iron. The system uses rubber bearings to prevent corrosion.

The system cost five times the amount of a normal-duty pump station, said Male.

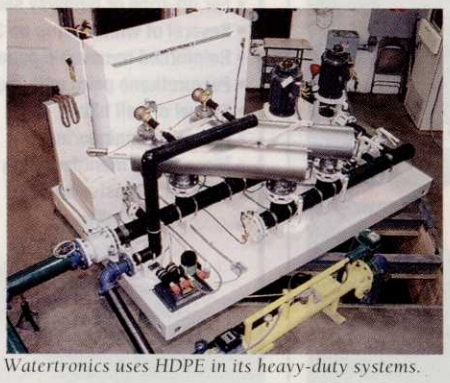
Syncroflo and Watertronics take different material approaches.

"We use a lot of fuse-bonded epoxy, especially on the impellers," said Syncroflo's Jim Simonini. "It is less expensive than stainless steel."

On a recent project in Puerto Rico, Syncroflo developed a system that used PVC piping and ductile iron on the check valves. The pumps were all stainless steel.

Watertronics, on the other hand, is partial to using HDPE for its corrosive duty systems.

"We have used HDPE in our BlackMax submersible pump stations for 15 years," said Watertronics' Rick Reinders. "With salt water systems we use all HDPE and coated steel. The HDPE costs slightly more than stainless steel because there is more labor involved, but the advantage is that it is completely inert and can better withstand impacts."


*Watertronics uses HDPE in its heavy-duty systems.*

The company is currently doing a project in Kuwait that is using reinforced fiberglass piping to combat extreme conditions.

**EFFLUENT APPLICATIONS**

While standard pump stations can handle effluent, which usually ranges from 600 to 1,500 tds, the higher-grade parts could find their way into these systems.

"With the knowledge we have gained, we may use more bonded epoxy for reclaimed systems," said Male. "There is a lot more demand for these systems because it is getting harder and harder to get quality water."

Another option is treating irrigation water before it gets to the pump station.

"Using sulfur burners from a company like Aqua $SO_2$ to clean up water, level pH and remove sodium may counter the need for epoxy or stainless steel," said Simonini.

With the use of injection systems on the rise, however, Reinders said HDPE is a good match.

"HDPE does not react with any of the fertilizers or acids that are being injected into the water," he said. "For those systems we use HDPE in the pump manifold."