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WASTE NOT WANT NOT

Superintendents face the new realities of water quantity and quality

BY JOHN WALSH

Water usage: It's a serious national issue, that's for sure. It's a lot more serious for some than others, but no matter the irrigation situation at the 16,000 or so of golf courses throughout the country, the majority of superintendents are striving to use less water more efficiently. And they're becoming better managers because of it.

It's a popular topic now, but water – both quality and quantity

– has been an important subject in the industry for years. It's been reported that perhaps as many as 1,000 golf courses in the country are irrigating with effluent water now.

"I'd say 95 percent of superintendents are definitely concerned about the quantity of water use," says Dennis Fitzwater, golf course superintendent at the private, 18-hole Corning Country Club in New York. "Today's super-

intendents are more educated about water use. We look at water quality differently than even five years ago. We can treat water or add amendments or surfactants to the soil to adjust pH, lower bicarbonate levels and help water do its job better."

DEALING WITH SALT

Mark Clark is no stranger to the water issues facing superintendents. He's been growing grass

with poor-quality water for years, and it's not getting better. Clark is the golf course superintendent at the 21-year-old Troon Country Club (a private facility not related to the management company). He has been a superintendent for 27 years and has been at the 18-hole club in Scottsdale, Ariz., for 10 of those. He maintains 419 Bermudagrass on the fairways and tees and SR 1020 bentgrass on the greens. He overseeds with

perennial ryegrass, working within a \$1.4-million maintenance budget as he tends to the 65 acres of highly maintained turfgrass (11 acres are part of a driving range). Clark's irrigation source has been city effluent water for eight years. Before that, it was Colorado River water and, before that, potable well water.

In Arizona, water restrictions started in the state's larger cities in 1980, resulting from a groundwater protection act. Currently, Clark estimates that 40 to 45 percent of the golf courses in the state use effluent water for irrigation.

"I have a limited amount of water to use to irrigate the golf course, but I have a 40-percent increase for leaching," he says.

Twenty-three golf facilities are on the same water line as Troon. The effluent water is treated off site at a water treatment plant, pumped to a water distribution system where it's stored until the golf courses need it, and then pumped to the golf courses' storage ponds.

The golf courses in the area paid for the city-maintained water distribution system, which is basically a storage facility. Each golf course on the water line negotiated with the city to pay an extra \$100,000 to have access to cleaner water. Not every course wanted it, but the decision was based on what the majority wanted.

"The cost could put some golf courses out of business," Clark says.

Clark pays \$1.16 per 1,000 gallons of water, spending a little less than \$200,000 annually for water, which doesn't include the electricity needed to pump it.

As a result of effluent water use, Clark has seen a decrease in the

quality of turf because of sodium build up.

"The grass can wilt, look salty, lose color and even die," he says. "It's difficult to establish ryegrass because it's more susceptible to salt than Bermudagrass. The members don't like it, but they understand the water situation."

To improve turfgrass health, Clark leaches greens once a week, but he doesn't leach the fairways because it's too expensive and time consuming. Instead, he relies on aeration, rain and topdressing.

Applying flushing-type wetting agents and topdressing fairways with sand are two popular ways superintendents deal with high salinity, says Clark, who spends \$1,700 an acre to offset the salt in the turf.

Many courses could switch to the usual salt- and drought-tolerant turfgrass, but a bigger problem is establishing cool-season grass when overseeding, Clark says. So, researchers are developing salt-tolerant ryegrass.

"Some breeders are finding positive results," he says. "We're still three to four years away from having something, but once we have that, we'll be ahead of the game."

A DELICATE BALANCE

Lee Bladen's water-use situation is different than that of most golf course superintendents. The superintendent at the 22-hole Old Palm Golf Club in Palm Beach Gardens,

Fla., has two water sources, potable and effluent, both coming from the same utility.

The 3-year-old, Ray Floyd-designed course, which features Seadwarf paspalum wall to wall, sits on a utility company's potable well field. Because of that, the golf course was designed around 18 wells. The majority of the water used to irrigate the course is reclaimed, but potable water is used within 75 feet of every well because the wells can't be contaminated with reclaimed water.

The effluent water lines and potable water lines at Old Palm are spaced 3 feet apart. All the lakes (58 acres) are lined because they hold reclaimed water. There are six irrigation pumps – five for reclaimed and one for potable.

Bladen negotiated a contract with the utility to pay about \$30,000 a quarter, which allows the course to use 1 million gallons of reclaimed water a day. Through another contract, Old Palm has rights to an additional 600,000 gallons at a fee of about \$4,000 a month, which is just

for the right to access the 600,000 gallons. If Bladen uses any of the 600,000 gallons, he pays about 25 cents per 1,000 gallons. In total, Bladen spends about \$200,000 a year for reclaimed water and about \$15,000 a year for potable water. His maintenance budget is more than \$2 million.

Golf courses within a mile of Old Palm use reclaimed water through the same utility, but each has a different agreement, Bladen says. Bladen is allowed to use potable water twice a week, and there's not really any restriction on the amount of reclaimed water he uses, although his usage is driven by cost.

Currently, Old Palm, which has a 33-acre practice facility, is in a drought condition, a modified phase three, Bladen says. Water use reduction is based on formulas that include soil type. The original phase three was to cut back 35 percent of a facility's water use. The grass at Old Palm isn't brown as it was when water use was limited to greens, tees and fairways.



At Troon Country Club in Arizona, superintendent Mark Clark spends \$1,700 an acre to offset salt in the turf. Photo: Troon Country Club

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WATER MANAGEMENT

Lee Bladen, superintendent at Old Palm Golf Club in Florida, negotiated a contract with a local utility to access an additional 600,000 gallons of reclaimed water to irrigate the course if needed. Photo: Old Palm Golf Club



"Last year, it got dangerously low to where we almost couldn't pump," Bladen says. "It was rough. I fought like hell to get more water. Now we're locked into an agreement. I have to make the best use of water, or I'm fighting a losing battle. Even though we're not restricted by the South Florida Water Management District, I still need to impose self restrictions."

At Old Palm, which is owned and managed by WCI Communities, the landscaping around the property is irrigated with a half million gallons of reclaimed water a day, and the golf course is irrigated with the same amount. Bladen's maximum a day is 1.6 million gallons, though he doesn't use it all.

"I'm drying up in some areas," he says. "I send out a newsletter to members to let them know what's going on. Everyone's well educated about the water issue. There are some golf courses on the other coast that are only allowed to pump 150,000 gallons a day. It's ugly. Last year, before I was able to get an extra 600,000 gallons, I was pumping 375,000 gallons a day for 110 acres."

Bladen also is looking at reducing the amount of highly maintained acres on the golf course, a practice that is part of the Audubon Signature Gold Program.

More recently, Bladen installed subsurface moisture sensors, which he can track on the computer, to help use water more efficiently. They determine when and what to water.

"I'm working all the time to reduce water use," he says.

LOOKING AHEAD

Because the water situation in Scottsdale is so serious, the city agreed never to build another golf course in the city limits, Clark says. If a course was built before 1985 and had access to well water, it has been allowed to keep using the well water to irrigate because of a grandfather clause that's part of the new water regulations. But that

right will be lost in the future, Clark says.

"They will fight hard, but politics will make them give it up despite the water law," he says.

Despite water-use concerns, the amount of groundwater in the Scottsdale area has actually increased because the city is taking renewable water and is putting it back into the ground, Clark says.

"It's all about how quickly we can turn water around," he says. "If you speed up the use cycle from tap back to tap, we'll have more water."

It's no question water is the No. 1 issue facing superintendents in Arizona – everything else is secondary, Clark says.

"More people are going to demand clean water, which is why the cost of water will increase," he says. "Water is the cheapest commodity in the U.S., yet it's considered a rare resource. I don't get it. We're going to see more of that, even in the places that have water, because effluent water is a commodity people can sell."

When it comes to water use and conservation, Arizona is ahead of the curve because it started regulation in 1980, Clark says.

"We've learned to manage," he says. We don't have 120-acres of turf on our golf courses. But I worry whether water will restrict golf course development in the future. That will be a difficult trend to overcome in a lot of parts of the country."

In the end, water use will change the way superintendents maintain golf courses. Some changes will be more severe than others based on location.

"I know there are superintendents suffering, but they're also becoming better," Bladen says. "They're also working harder because they have to make water go farther."

Clark predicts an even more drastic change.

"It's becoming very difficult to grow grass with poor water quality," he says. "I see us playing on synthetic grass in the future." **GCI**



SMART IRRIGATION

INSIDE

3

LESS IS MORE

Superintendents downsize water consumption by upgrading efficiency

10

MAKING HISTORY

A new superintendent facilitates a new irrigation system at the oldest 18-hole private golf course west of the Mississippi

16

IT'S NOT A DIRTY WORD

Effluent water is becoming a more common irrigation source

22

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Less is More

Superintendents downsize water consumption by upgrading efficiency

By John Walsh

Irrigation is an important issue to many golf course superintendents, even in areas where high-quality water is plentiful and restrictions are nonexistent. In states such as Arizona, Florida and Georgia, regulations and restrictions can result in less-than-desirable water quality at reduced quantities, making it difficult to grow healthy turfgrass. But throughout the country, diligent superintendents are working to irrigate more effectively and efficiently.

INTRODUCING BROWN

At the private California Golf Club of San Francisco, golf course superintendent Tom Bastis doesn't pay for water. He does, however, pay to pump it from two wells that sit on property.

"Other courses in the area pay half a million dollars or more annually for water," says Bastis, who grows fine fescue in the rough, colonial bentgrass and fine fescue on the tees and fairways, and A-1/A-4 bentgrass on the greens.

Despite not having to pay for the water, which is high in bicarbonates and has a pH level of 7.7, pressure to restrict its usage comes from Bastis, who operates within a \$1.6-million maintenance budget.

"Nobody is looking at how much we pull out of our wells," he says. "Yet, 30 minutes away in the East Bay, there's water rationing."

There used to be three other clubs – San Francisco Golf Club, The Olympic Club and Lake Merced Golf Club – tapping into the same aquifer as California Golf Club, but these facilities pulled out and are paying for reclaimed water, which is better saltwise

than the water Bastis uses.

"I'd consider buying reclaimed water," he says. "It puts the golf course in a better light. The resources are getting taxed, and sooner or later someone is going to come and tell us to get off the drinking water. But right now, they're just asking what we're using."

As part of a recent course restoration, Bastis changed all the grass types to those that are more drought tolerant because he's trying to dry out the golf course. He also increased the native areas on the course from 20 acres to 55 acres.

"We're trying to change and evolve," he says. "We're predominantly *Poa* in this area. We're introducing brown to the course in the fairways partly because we don't want to create that much thatch and growth. This course is about players, not green grass everywhere."

Bastis is using water more efficiently, partly because of an irrigation renovation that increased the size of the pump station, which, in turn, decreases overall watering time.

Also, subsurface drip irrigation, which was installed around all 144 bunkers, and closer

Superintendents need the right tools and accurate intelligence to create a high level playing surface across a golf course.

But now, superintendents want more: precise data about irrigating to prescribed depths in the root zone, the capacity to prevent leaching or runoff and use fungicide and fertilizer to their optimum levels.

AquaSpy – the world's most advanced soil moisture system – gives the superintendent the technology and intelligence they need to achieve these goals. AquaSpy's Golf and Sports Turf Division, GolfLinx, provides the technology neatly packaged for over one hole, three holes, nine holes or an entire course.

"Having been a golf course superintendent for 35 years I actually thought I had done it all," says Lee Bladen, the Golf Course Superintendent at Old Palm Golf Club in Palm Beach Gardens, Fla. "AquaSpy has completely changed the way I irrigate my golf course."

"This moisture sensing technology allows me to accurately place fungicides and additives in the soil where I want them. Also, no more probe, feel, and guess work. Best of all, I have reduced my watering frequencies and quantities."

Each AquaSpy probe is "stacked" with layers of sensors that provide precise and easy monitoring at multiple 2-inch depths – up to 12 inches – so the superintendent understands what is happening in the root zone. From there, the probe can deliver intelligence on infiltration rates, root activity, drainage and plant turf water use.



The probes report back to the Course Maintenance Facility allowing the Superintendent to irrigate to the desired depth of the root zone. This eliminates guesswork and assists the Superintendent in determining when to irrigate after a rain event, and identify how deep typical irrigation affects the soil profile over time.

AquaSpy integrates climatic data with soil moisture and salinity data into one package enabling the Superintendent to either prepare for rain events or monitor salinity "build-up" and oversee the leach/flush process at the correct times and to the correct depth.

The AquaSpy Viewer range of software packages are designed exclusively for Superintendents and data can be accessible anywhere, anytime using a PC or laptop with internet connectivity, regardless of the PC operating platform.

The data downloaded on the PC or laptop is highly repeatable – which is critical for irrigation scheduling – and enables the customer to watch the plant extract soil moisture through a continuous logging process. Results Trends over time are easily displayed graphically.

AquaSpy has created a fully sealed tube that enables the sensors to sit against the inner wall of the tube housing. This eliminates one of the major issues plaguing soil moisture sensors – the air gap. This unique, patented design dramatically raises the bar when it comes to the sensor's accuracy, precision and repeatability.

It also creates unrivalled convenience and flexibility. AquaSpy probes are installed below the surface, making them ideal for turf applications. The technology is suited to all soil types and each unit is easy to install.

AquaSpy industrially designed, low cost, plug and play technology has been developed by AquaSpy Inc and its US-based sports turf arm GolfLinx.

AquaSpy chief executive Nigel Hennessy said soil moisture technology is an essential tool for Superintendents faced with water shortages and the need to cut costs while maintaining the demands of fine tuning playability on their golf courses.

"Our new multi-sensor probe delivers water savings and enables managers to manipulate the speed of the greens and bring the course up to competition level," Mr Hennessy said.

This is echoed by the responses from other Superintendents who have installed AquaSpy probes, including Scott Whorrall, the Director of Golf Course Operations, The Club at Mediterra in Naples, Fla.

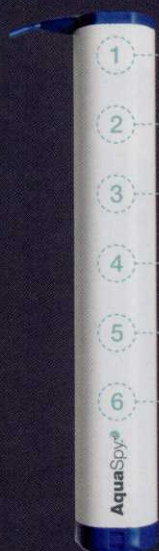
"As water availability and costs continue to be a concern in our area, AquaSpy has been an excellent tool for helping Mediterra reduce its irrigation volume while maintaining healthy turf," Mr Whorrall said.

Find more information about AquaSpy products at www.aquaspy.com or contact the company at 714-966-1975.

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- 2**
4 inches deep
Monitor changes in infiltration
- 3**
6 inches deep
Observe root zone activity
- 4**
8 inches deep
Prevent nutrient losses
- 5**
10 inches deep
Confirm strategic leaching.
- 6**
12 inches deep
Monitor perched water table

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The new generation of AquaSpy water management systems gives you a complete understanding of the turf environment right through the soil profile. No other soil moisture probe in the world transmits data in 2 inch increments to a depth of 12 inches.

A modular, no maintenance design and an open and common platform enables plug and play connectivity.

GolfLinx gives you the science to promote turf health, reduce water and energy consumption as well as cutting fertilizer costs. Competition level golf courses use the AquaSpy technology to maximize these benefits while improving playability and fine tuning greens.

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irrigation-head spacings – 5 feet closer, from 65 feet to 60 feet apart, because the course is impacted highly by wind – contribute to irrigation efficiency.

AN UPGRADED SYSTEM

Dennis Fitzwater isn't facing any water issues or regulations, but the golf course superintendent at the private 18-hole Corning Country Club in New York is still trying to use water more efficiently.

With a budget of \$440,000, Fitzwater grows bentgrass/*Poa annua* greens, tees and fairways, and bluegrass/ryegrass rough. The average rainfall in Corning has been below normal during the past few years, but nowhere near drought conditions, Fitzwater says, adding that any change in the use of water will be driven by the Chesapeake and Delaware water system. Located in the Susquehanna watershed, Corning's water

source comes from two ground wells from which Fitzwater pumps directly.

"It's not a big difference compared to those who have ponds, but the disadvantage is that I can't see the water level," he says. "Still, I don't have to deal with evaporation. I don't worry about whether the wells are going dry. I just pay to pump the water."

There are several parts of Fitzwater's irrigation system that improve water efficiency:

- Variable frequency pumps, which have drive motors that eliminate water hammer and control the flow of gallons per minute.
- Upgraded computer programs that pinpoint where to apply water, allowing for individual head control, convenient scheduling, nighttime watering and labor reduction.
- Sensors that turn off the system when it rains.

Fitzwater's irrigation software is 2 years old, but the irrigation system itself is 9 years old. He can't justify replacing all the heads, but any replacement to the system always incorporates the newest technology.

"We maintain firm, quality conditions," he says. "We push water to the fullest extent. I've never heard about the course being not green enough or lush enough. Our members understand the water issue."

The water Fitzwater uses to irrigate Corning is high in pH and salts. To combat that, he uses soil amendments and plans to add a synthetic acid injection system, which will lower pH and bicarbonate levels and reduce the need for surfactants and amendments.

WETTING AGENT MAN

Much like Fitzwater, Jason Regan isn't facing stringent water-use regulations, but water efficiency is something he tries to improve. The golf course superintendent at the private,

"We push water to the fullest extent. I've never heard about the course being not green enough or lush enough." - DENNIS FITZWATER

18-hole Selma Country Club in Alabama maintains Tifdwarf Bermudagrass greens and 419 Bermudagrass tees and fairways with a maintenance budget of \$320,000.

However, the club installed a new Toro irrigation system in 2000. Since then, Regan has seen improved turfgrass health. The double-row irrigation now in the fairways used to be single row.

"It's like night and day," he says about the improved turfgrass conditions.

Regan has no irrigation in the rough and says it will take another five years to irrigate the entire course. Improvements to the club

At California Golf Club of San Francisco, the pressure to use water more efficiently is internal from superintendent Tom Bastis. Photo: California Golf Club of San Francisco



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