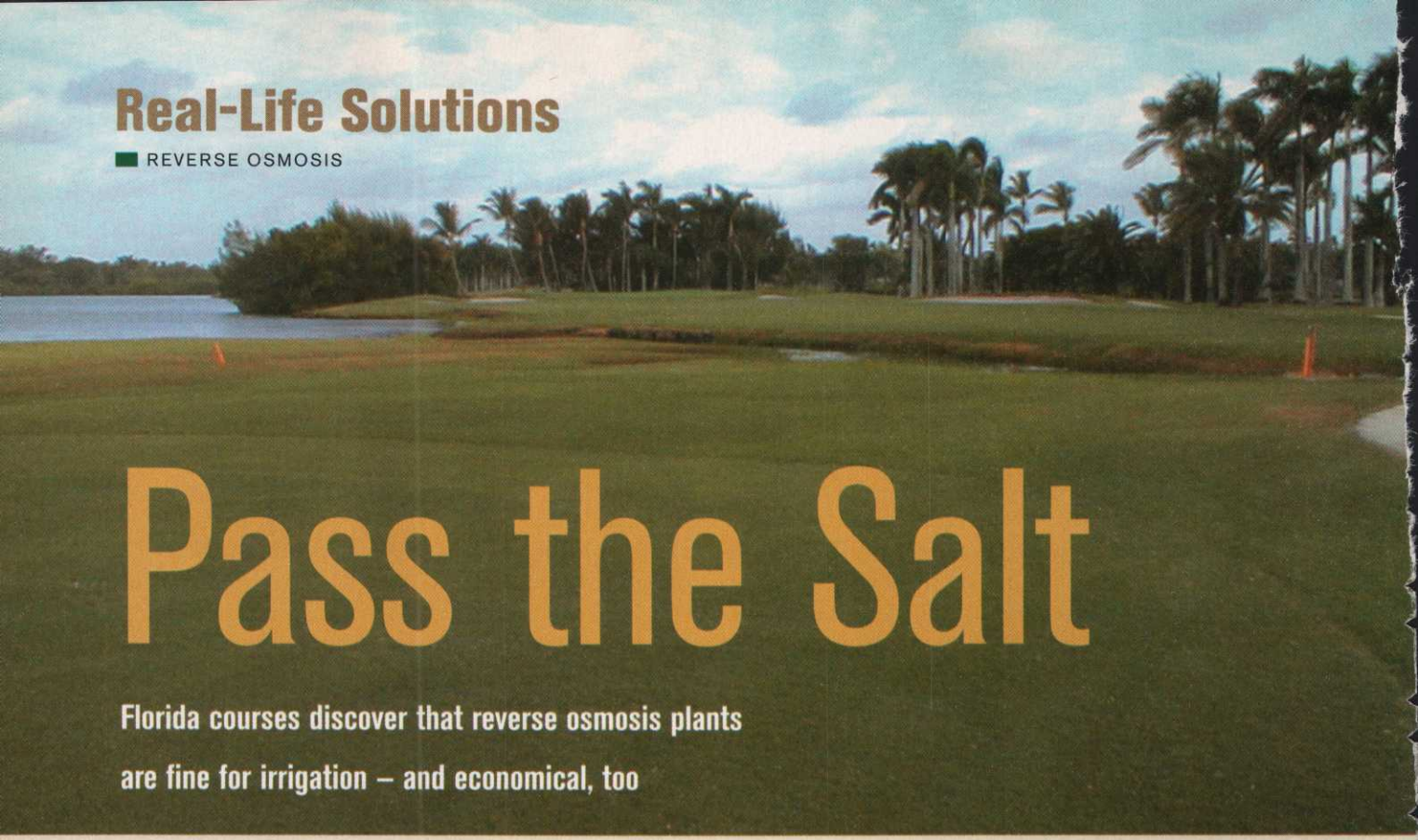

Pass the Salt

Florida courses discover that reverse osmosis plants are fine for irrigation – and economical, too

The turf at Jupiter Island Club is always well-irrigated, thanks to the course's reverse-osmosis system.

BY LARRY AYLWARD, EDITOR

The summer of 1996 in Hobe Sound, Fla., was fiercely hot and desert-like dry. It was scorching enough that the city's utility company cut off the water supply to its nonemergency-use customers, including The Jupiter Island Club. Rob Kloska, superintendent of the Jupiter Island Club in Hobe Sound, was left without adequate irrigation. While Kloska wasn't happy with the ruling, he understood. And deep down, Kloska even felt a hint of bliss. He knew the course needed to make a change regarding its irrigation supply, and he had to sell members on it.

Kloska also knew what he wanted for his new irrigation source. "[The utility company's] decision was a great bullet in the gun for reverse osmosis," he says.

Reverse osmosis is the process of extracting salt and other minerals from brackish salt water and converting it to irrigation-quality water. Reverse osmosis plants are popular in the Middle East, where fresh water is scarce. Some critics say reverse osmosis plants are too expensive too build and operate in the coastal United States. Environmentalists voice concerns about how to dispose of the salty brine extracted during the conversion process.

Problem

Superintendent Rob Kloska needed to find an alternative irrigation source for the Jupiter Island Club in Hobe Sound, Fla., mainly for two reasons – to offset the high price of potable water and to be free from local water restrictions.

Solution

Build a reverse-osmosis plant to manufacture the course's own water for irrigation.

The Jupiter Island Club is a high-end golf course located on a barrier island. The Atlantic Ocean borders the course to the east, and the Intracoastal Waterway is to the west. The course's location leaves it with few options for its irrigation source, Kloska says.

"We looked at piping in effluent water, but the one entity that creates wastewater is too far away," Kloska says. "The cost to get the pipe from there to here is well over the amount it would cost to build a reverse osmosis plant."

Drawing water from a shallow well also isn't feasible because the island is only about a half-mile wide and doesn't hold a lot of fresh water in the ground, Kloska notes.

That leaves the city's potable water, which the course was using. But it was expensive and getting more costly. The course paid about $1.87 per 1,000 gallons of water in 1996. If there was a water restriction, like in the summer of '96, it was a good chance the course would be left high and dry if the city decided to scale back consumption. If that happened, Kloska would have to improvise when it came to irrigation. He also wouldn't have water to use for renovation or construction projects.

A field trip

Kloska was hired at Jupiter Island in June 1995. In February 1996, the members purchased the club from its private owner.

Around that time, Kloska met with the few members tabbed to operate the club. They talked about a five-year plan for equipment replacement, rebuilding the greens and updating the irrigation system. They also talked briefly about a reverse osmosis plant as the course's source for irrigation water.

In the summer of 1996, Kloska took a field trip to The Everglades Club located in nearby Palm Beach, Fla., which had recently installed a reverse osmosis plant. Like Jupiter Island, The Everglades Club purchased potable water from the city and paid more for it than Jupiter Island. "Our bills were up in the $250,000 range," says Peter Brooks, the course's certified superintendent.

After Brooks gave Kloska a tour of the plant and talked about its benefits, Kloska was sold. "I saw it and said, 'This is what we need at Jupiter Island,' " Kloska says.

Kloska knew the dirt on desalinization was that it was too expensive to use on a golf course. A plant costs around $1 million and can also be expensive to operate because it uses electricity to clean the water. But the more Kloska studied the feasibility of installing a system at his course, the more he realized the expense factor was overrated, at least for Jupiter Island.

In early 1997, Jupiter Island hired an outside firm to conduct a study to determine if a reverse osmosis plant was feasible for the course and how long it would take to pay for itself.

"The members of The Everglades Club are similar to the members of our club," Kloska says. "If something doesn't make financial sense, they won't commit to it."

The study revealed a plant was feasible, and Jupiter Island's members agreed with Kloska to purchase a reverse-osmosis system in early 1998 from Waterlink, a Columbus, Ohio-based provider of integrated water and air purification solutions for industrial and municipal customers. A little more than four years later, the system paid for itself, Kloska says.

"Ultimately, Mother Nature decides how fast you must pay off a reverse-osmosis system," Kloska says. "If She decides it's going to be dry, your payoff is going to be shorter. If She decides it's going to be wet, your payoff will be longer."

The price of municipal water also plays a role. "Every time the price of water gets raised, your payoff is shortened," Kloska adds, noting the price of water increased to about $2.25 per 1,000 gallons by the time construction of the course's plant was completed.

The Jupiter Island Club's reverse-osmosis system draws about 520,000 gallons of water a day from a well, and the course uses an average of 400,000 gallons a day.

The course's reverse-osmosis plant consists of a 1,700-foot well that supplies the brackish water; equipment and machinery; and a building. The system draws about 520,000 gallons of water a day from the well and produces 400,000 gallons a day for irrigation use. The course uses an average of 270,000 gallons a day during the year. The course also

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"The No. 1 thing it gives the course is immunity to all water restrictions."

ROB KLOSKA,
SUPERINTENDENT,
JUPITER ISLAND CLUB

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uses recycled water captured by drainage systems from the greens and bunkers. Kloska explains how the reverse osmosis system works:

"We're taking the source water, which has salt in it, and we're increasing the pressure of it and pushing it through what are called vessels. As the water passes through the vessels, the salt of the water is pushed to one part of a vessel and the clean water is pushed to the other part. Then the clean water is saved and sent in one direction, and the brine is sent in the other direction."

Of every four gallons of water taken out of the well, three are made into water that the course uses to irrigate. The remaining gallon of brine is dumped in a gravel swale that percolates into the ground.

"The salinity of that water is similar in parts per million to the water in the Intercoastal Waterway, which is only about 200 yards from the swale," Kloska says. "So it's a good fit."

What to do with the concentrated brine is an issue with reverse-osmosis plants, but not a problem, Kloska and Brooks agree. At The Everglades Club, the brine flows to a percolation pond on the west end of the golf course, where it filters safely into the ground. Brooks says brine disposal varies from course to course.

Other than brine disposal, the reverse-osmosis system has created few maintenance challenges, Kloska says. "The one negative about reverse osmosis is that it cleans the water so thoroughly that it takes all of the ions out of the water, which makes the water more corrosive than salt water," he notes.

As a result, the course's pump station becomes corroded much faster than it would if it was using municipal water. "It's not that big of a deal, but it comes with the territory," Kloska says.

Initially, Kloska was concerned about irrigating with the ionless water, but the only problem he says he's seen is a spike in the pH level of the pond water, which ran as high as 8.5. Kloska added an acid injection system to the irrigation system and the pH level dropped. "The turf looks good," he says.

There are standard short-term and long-term maintenance issues. For instance, filters need to be cleaned regularly, and the well's membranes should be replaced every 10 years.

While it costs nearly $1 million, Kloska and Brooks say a reverse-osmosis system makes perfect economical sense for clubs like Jupiter Island, Everglades and others that use expensive potable water. "In this area, only the coastal golf courses are currently looking into [reverse osmosis] because we're the clubs who predominantly buy potable water for irrigation purposes," Kloska says.

Brooks says Everglades' reverse-osmosis system produces the course's water for only $25,000 a year.

"This has turned out wonderfully for us," he adds. "The water quality is superb, and the plant runs like a top."

The expensive-to-operate issue is overrated, both superintendents agree. Kloska says it now only costs the course 78 cents to make 1,000 gallons of water by reverse osmosis, and that includes the price of electricity. If Jupiter Island were still using potable water, it would pay $2.90 per 1,000 gallons today.

There are different types of reverse-osmosis plants. For instance, Jupiter Island's plant is designed to run continuously for better efficiency. But Everglades' plant is not designed to run continuously and usually operates only at night when the city's local utility company offers cheaper rates for electricity. The plant can produce up to 35,000 gallons of water an hour. "I'm running it cheap," Brooks says.

Kloska says he wouldn't be surprised if the day comes when more golf courses in the Northeast and Southern California turn to reverse osmosis for irrigation purposes.

"[Golf courses] get a bad rap because people say they use too much drinking water for irrigation," he says. "If enough people get behind such a movement, they can make a lot of noise. There may come a time when other superintendents may have to look at reverse osmosis as an alternative because they're being threatened [with the fact that] that their potable water is going to be taken away."

The best thing about reverse osmosis, Kloska says with a sigh of relief, is that he no longer worries about the course's water supply being shut off.

"The No. 1 thing it gives the course is immunity to all water restrictions," Kloska says. "Like I've told people many times, 'He who has the water has the power.' " ■

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Getting Creative Around the Greens

Air machines help superintendents solve moisture and temperature woes

BY SHANE SHARP

The 14th green at the TPC at River Highlands had experienced moisture and temperature problems until a Soil Air Technology Unit was installed.

Golfers love traditional holes with greens tucked away in shady groves. But for superintendents, such tranquil settings can spell trouble when it comes to turf maintenance.

Thick stands of trees coupled with dense underbrush can limit the airflow and sunlight reaching a green. As a result, the putting surface often suffers from excess moisture, with symptoms ranging from spotty, inconsistent growth to complete turf loss.

Golf courses frequently rely on labor-intensive solutions to combat moisture and temperature problems on greens. Superintendents and their crews cut down trees, clear out underbrush and frequently aerify to increase sunlight and airflow.

Problem

Two courses, one in Connecticut and one in North Carolina, experienced temperature and moisture problems with their greens.

Solution

Install machines to push and pull air through greens and their root systems, thus improving the health and playability of the putting surfaces and saving hours in manual labor.

The problems

The 14th hole at the Tournament Players Club at River Highlands, outside of Hartford, Conn., is one of those holes that drives golfers to their cameras — and superintendents to early graves. The 413-yard, par 4 drops 60 feet downhill to a green that's stashed in a small hollow, surrounded by trees on three sides.

The 14th had experienced moisture and temperature problems since a major rerouting of the course in 1989 left it enveloped by a shady dale with just enough airflow to dry Andre Agassi's hair. The course is home to the PGA Tour's Greater Hartford Open, as well as a cadre of maintenance-conscious members. Hence, superintendent Tom DeGrandi is expected to have the challenging hole and the entire layout in championship condition throughout the playing season.

Ballantyne Golf Resort in Charlotte, N.C. is the one of the only full-fledged golf resorts between Pinehurst and Asheville, and is among the highest priced daily-fee courses in the Charlotte area. Because of the region's benign climate, superintendent Paul Stroman is expected to have Ballantyne's bentgrass greens in top condition year-round.

The course's precariously hilly terrain and the resulting green complexes meant 13 of the course's 18 putting surfaces were holding excess moisture in the upper portion of the greens. Subsequently, excessive algae and black layer were beginning to cut off the breathing of the turf's root system.

The solution

DeGrandi and Stroman sought Soil Air Technology, a Connecticut-based construction and engineering firm, to help them with their problem greens. Soil Air Technology

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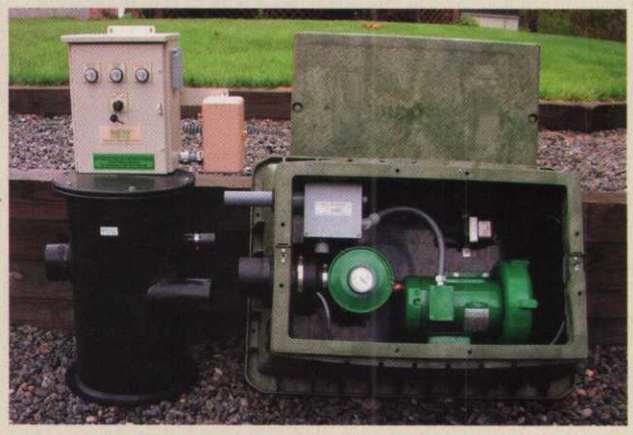
designs and manufactures systems that connect to the main drainage lines of golf greens. These machines are able to push and pull air through greens and their roots systems, thus improving the health and playability of the putting surfaces and saving hours of manual labor. Units are available in a variety of models and can be either stationary or portable, depending on a course's specific needs.

DeGrandi says he considered a variety of options to bring the 14th green up to par with its 17 true-rolling siblings. But after a few years, it was obvious traditional treatments weren't working. Soil Air Technology approached DeGrandi in 1999 about installing one of its Model 110V VPC-T units free of charge as a demonstration project, and DeGrandi jumped at the opportunity.



The Soil Air Technology units increase the amount of oxygen to greens to help them drain better.

"The quickest, cheapest option would have been to do it with just the tree removal and create wind channels, but we chose to do everything at the same time to correct the situation as quickly as possible," DeGrandi says. "The Soil Air Technology unit was a long-term solution to a recurring problem."

The unit was installed on the 14th green prior to the Greater Hartford Open. The submerged, stationary model was so quiet the players didn't even know it was running. Two weeks after its installation, the green's roots were deeper and the putting surface was firmer.

Today, the unit runs up to six hours a day and members hardly notice. DeGrandi, however, is quick to say that superintendents who consider using Soil Air Technology units should approach their problems from a variety of angles.

"Any good superintendent is going to look at a combination of things to make an improvement," he says. "We also installed a fan on that green to dry it out. But what we were hoping to get from the device was to increase the amount of oxygen in the green so it would drain better, and we've gotten that."

In the summer months, the unit is used primarily to pull air through the green. In the early spring and late fall, it's used to push air up into the green to melt the morning frost. "Mainly, we just want to create airflow through the green, and this is the optimal way to do it," DeGrandi says.

The GTS-RG portable unit is easily transferred between holes.

To combat Ballantyne's problem, Stroman and his staff purchased Soil Air Technology's GTS-RG portable gasoline engine-powered system a year after the course opened in 1998. The unit, which cost $12,000, is easily transferred between holes. Stroman also installed hookups on the remaining five greens in case problems developed down the road.

"We wanted a good portable unit," Stroman says. "If we didn't have it, we'd have to increase the aerification in the greens by way of spiking and small-tine aerification. We are a resort course, and we're a popular local course, so we didn't want to disturb play that much. Anyone that knows Charlotte golf knows it's a very competitive market for daily-fee golf."

Unlike the submerged unit at TPC River Highlands, the portable model does generate enough noise to disturb golfers, and Stroman says this limits its use. The Ballantyne crew typically runs the unit early in the morning, or during the middle of the day in the summer when few golfers are on the course.

The outlook

Free handout or not, DeGrandi says he would have opted for the Soil Air Technology unit. "Based on its theory, I would have paid for it anyway," he says of the Model 110V VPC-T unit, which costs $7,500.

At Ballantyne, Stroman says his crew will continue to use the portable Soil Air Technology unit because of its spectrum of benefits.

"The main benefit of the unit is that we are able to control the moisture in the greens," Stroman says. "We pull air through the green for soil moisture and temperature control. But the other benefit is that you are changing the air combinations in your greens. If you have a high concentration of carbon dioxide, you can get more oxygen in the green." ■

Sharp is a free-lance writer from Charlotte, N.C.