At A Glance:
Normandy Shores Municipal Golf Course

Location:	Miami Beach, Fla.
Type of facility:	Public
Type of project:	Renovation
Cost:	$6.5 million
Construction started:	September 2007
Construction ended:	November 2008
Length:	6,465 yards
Architect:	Ken Williams of Arthur Hills/Steve Forrest and Associates
Golf course superintendent:	David Duffy

nology with a pump system," Griffin says. "They may do it using gravity, but not with pumps."

A LITTLE HISTORY

Golfers may never know about the unique water injection system at Normandy Shores. To them, the reopening of the course is a small miracle because Hills/Forrest's year-long, $6.5-million renovation resuscitated a course that had been buried beneath the weeds of the island since 2003.

"The term 'hidden gem' has been beaten to death, but Normandy Shores is the real thing: a gem of a course once loved, once hidden, but now open to the public again and better than it ever was," Williams says. "The best part is that visitors can play without beating up themselves or their wallets – like they might at one of the $200-per-round resort courses in this neighborhood."

Originally designed by architect William Flynn and partner Howard Toomey, the facility was dedicated officially by the city in December 1941. Retaining the original Flynn/Toomey routing, Mark Mahannah redesigned Normandy Shores in the 1950s, but most of Flynn's bunkering influence and green contours disappeared. It then became a stereotypical Florida course – slightly elevated tees, flat fairways and bunkers, elevated greens and a lot of water.

Eventually, Normandy Shores faced the same decline experienced by South Beach in the late 1960s, '70s and '80s. Courses such as Links at Crandon Park (previously The Links at Key Biscayne) and Doral took over the spotlight. Budget cuts and lack of maintenance eventually led to Normandy Shores' closing in 2002.

The closing was never meant to be permanent, however. Miami Beach City Commission already retained Hills/Forrest to orchestrate its revival. Work finally began at Normandy Shores in September 2007. Like Mahannah, Williams retained the original Flynn routing, although he flipped the two nines. The result is a 6,465-yard layout that locals may have trouble recognizing.

A NEW LOOK

The redesigned par-71 track represents a return to a more traditional approach to strategy and visuals. In contrast to the modern trend of expensive water bodies and enormous sand features, Normandy Shores is a picturesque, straightforward golf experience distinctly lacking ostentation. In an era of 7,000-plus-yard behemoths, it may be the only newly renovated course that kept its original yardage. It's a medium-length course with 70 bunkers and a handful of ponds on 89 acres, compared to 120 acres or more for most modern layouts. Most of the landing areas are bordered by bunkers or water.

The new bunkers are deeper than those they replaced. Many are grass-faced, and some have fairly steep walls. Ponds were combined and new ones dug, creating the fill Williams required to add mounding and contour.

The new turf, seashore paspalum, can be irrigated with brackish or salty water and requires few chemical inputs.

"It survives better underneath standing water, which is still an occasional issue here," Duffy says. "We received 5 inches of rain one day on top of the new paspalum during construction. We had standing water for quite awhile. If we had planted bermudagrass, we probably would have had to replant that section of the course. But the paspalum came through the flooding very well."

Construction started in fall 2007 and was completed mostly in a year.

"The soil conditions were bad, the turf was old and the course was weed-infested," Duffy says. "Ken overcame those challenges and the job went smoothly." **GCI**

Peter Blais is a freelance writer in North Yarmouth, Maine.

DIVIDE AND CONQUER

BY JIM CONNOLLY

Implementing section maintenance can increase operational efficiency, improve playing conditions and reduce costs

The current economic downturn is pressuring golf course superintendents to scrutinize all maintenance operations to improve efficiency. Because labor represents the largest part of a maintenance budget, it's often targeted for reductions.

"Staff reductions range from 10 to 30 percent, with even more cuts possible later this year," says Larry Gilhuly, director of the Northwest region for the USGA Green Section. "Superintendents may need to look at a complete change in management philosophy, and that's not easily done."

Gilhuly has visited hundreds of golf courses throughout the Pacific Northwest and Hawaii, providing advice and guidance through the USGA Green Section's Turf Advisory Service. Hawaii seems especially hard hit by the reduction in play at resort courses that depend on tourists from the mainland and Japan. Facilities on the islands are using an alternative type of maintenance called section maintenance successfully, Gilhuly reports. He believes section maintenance is an excellent option to improve efficiency, create better playing conditions and, in some cases, reduce maintenance costs. Converting from a conventional maintenance operation to section maintenance is a practice Gilhuly has been promoting for years since he first wrote about it in the USGA Green Section Record in 1991.

Maintenance methods among superintendents vary widely, and it's almost impossible to say there's a universal system everyone should use. Superintendents who use all or part of the section maintenance concept are often surprised more superintendents don't implement the practice.

The core idea of section maintenance focuses on individual responsibility, accountability, efficiency and a more astute attention to detail. A significant difference between conventional maintenance and section maintenance is how tasks are assigned and carried out. Conventional maintenance assigns a task to an individual that must be completed throughout an entire golf course. Section maintenance assigns an employee multiple tasks to be completed in a limited area or section. Many superintendents use varying combinations of both methods, but there are fewer that use section maintenance as their primary form of maintenance.

BORN OUT OF FRUSTRATION

Located just outside the city limits of Asheville, N.C., the Biltmore Forest Country Club is rated one of the top courses in the state. One thing that makes Biltmore Forest unique is the money it doesn't spend maintaining the course. Even though the club has the means to spend more, Bill Samuels, CGCS, holds the purse strings. He believes section maintenance is the most effective, cost-efficient method to maintain a golf course to achieve the high-quality results worthy of a high-end private club.

Samuels doesn't remember how, or exactly why, he started using section maintenance. But he does know it was born out of frustration with the lack of accountability in maintenance and evolved throughout time.

"I started experimenting with different ways to improve maintenance efficiency in 1993 and found my staff morale improved and maintenance costs could be decreased by about 30 percent using section maintenance," he says. "I'm surprise more superintendents aren't using this method."

While experimenting with ways to improve efficiency, Samuels found it took too many people to complete a job.

"I would send three people out to do a job only to find it wasn't done properly," he says. "I couldn't tell who was performing at a low level."

Biltmore Forest's staff consists of 12 full-time and two part-time workers. The full-time staff is divided into five categories:

- Section team – seven people

- Mechanic – one person
- Assistant superintendent – one person
- Rough and fairway mowing – two people
- All-purpose rover – one person.

Each section team member is given three holes (includes practice areas) and a personal equipment inventory that consists of:

- A work vehicle for hauling and transportation;
- A Jacobsen 22-inch walk-behind greensmower;
- A Jacobsen 22-inch walk-behind tee, collar and approach mower;
- An Allen hover mower with a Honda four-stroke engine;
- A Stihl leaf blower;
- A Shindaiwa power string trimmer;
- A Honda push rotary mower for trimming around greens and tees; and
- Various hand tools for raking bunkers and other light maintenance.

Rough and fairway mowing is a daily operation using a Toro 4500, 5400 and 5510. On days when one of the section team members is off or sick, the rover and other team members pick up the slack. The staff meets early every morning to review the day's work schedule and prepare for the occasional special event. Table 1 at the right shows the tasks and assignments for a typical week. The staff members are familiar with the routine that needs to be completed before the golfers arrive and have become proficient at staying out of their way. It takes time, experience and training, but Samuels says the members are pleased with the form of maintenance and interruptions haven't been an issue.

BETTER DETAIL WORK

Another superintendent that espouses the benefits of section maintenance is Steve Kealy, CGCS, at the private, 18-hole Glendale Country Club in Bellevue, Wash. Kealy has been using his tailored maintenance program for about 10 years. For him, the advantages of section maintenance include pride in ownership, attention to detail, healthy competition and improved employee accountability.

"I found details – such as cleaning bathrooms, edging ball washer stands, trimming and cleaning out the bottom of garbage cans – were missed regularly, and conditions weren't meeting my expectations," he says.

Kealy uses a slightly different work schedule with his full-time staff of 14 and seasonal staff of 10, but the philosophy is similar to Biltmore Forest's (see Table 2 on page 64). Kealy gives each of the five section members a comparable area in terms of time and workload. Workers balance an equal numbers of greens, bunkers, trimming areas and tasks.

RESULTS AND COST SAVINGS

Developing a section maintenance program requires acquiring tools and equipment. Each crew member needs a stable of equipment, and it may take several years to build the inventory. But once built, the benefits of section maintenance can be seen in many areas of the golf course operation.

At Biltmore Forest, the average age of the Jacobsen greensmowers is 20 years and is a testament to the individual care each crew member gives to the machines. Biltmore and Glendale have low staff turnover and a high level of experience among crew members. Glendale has a combined 63 years of experience among its five crew members.

Maintenance budgets can be reduced using section maintenance, too.

"I would be spending at least 30 percent more if I used the old method I used to use," says Samuels, who describes his operation as lean and mean with the benefits of an immaculately maintained golf course worthy of praise.

Kealy, rather, focuses more on the results he can achieve rather than a cost savings between the two forms of maintenance.

TABLE 1

Biltmore Forest Country Club golf course section maintenance schedule

At Biltmore Forest, Bill Samuels, CGCS, defines section one as holes 14, 16 and 17. Section two is defined as hole 13, the practice green, nursery green, driving range tees and mowing the front circle on Mondays. Section three includes holes three and 10 and the chipping green. Section four is defined as holes one, nine and 12. Section five includes holes four, five and six. Section six is defined as holes seven, eight and 11, as well as mowing along Stuyvesant Road below the tennis courts and mowing by the pool on Mondays. Section seven is defined as holes two, 15 and 18.

Task	Mon.	Tues.	Wed.	Thurs.	Fri.	Wknds.
Mow greens		X	X	X	X	X
Cut clean up		X		X		SAT
Mow tees	X			X		
Mow collars	X			X		
Mow green / tee surrounds	X				X	
Trim bunker faces			X			
Empty trash cans	X	X	X	X	X	X
Hand rake greenside bunkers	X	X	X	X	X	X
Check fairway bunkers	X		X		X	SUN
Hand rake fairway bunkers		X		X		SAT
Check number and condition of bunker rakes	X	X	X	X	X	X
Sand tee divots as needed – green sand	X	X	X	X	X	
Sand fairway divots as needed – white sand	X	X	X	X	X	
Check placement / condition of tee markers	X	X	X	X	X	X
Trim yardage markers-sprinkler heads – valve boxes as needed	X	X	X	X	X	
Edge cart paths and sweep as needed	X	X	X	X	X	
Change ball washer water	#1	#2	#3	#4 and #5	#6 and #7	
Check tee towels – change if dirty	X	X	X	X	X	X

TRUST IN OTHERS' PERFORMANCE

The increasing demands on a superintendent to maintain excellent conditions while reducing maintenance costs is a stiff challenge. Maintenance operations require constant evaluation of staff performance and accountability. Delegating responsibility and demanding accountability is just one of the advantages of section maintenance. The flaw of many superintendents and the primary reason for job burnout is adopting the axiom, "If you want something done right, do it yourself."

Developing a performance level you can trust, resulting in high morale and accountability, is one way to reduce a superintendent's stress level and achieve employee satisfaction. Section maintenance deserves a closer look for maintenance programs and may be an excellent way to achieve goals set for the year. GCI

Jim Connolly, a former USGA agronomist, is president of JCC, a Spokane, Wash.-based consulting firm.

TABLE 2
Glendale Country Club golf course section maintenance schedule

At Glendale, Steve Kealy, CGCS, defines section one as holes one, five, 15 and 17. Section two is defined as holes two, 12, 13 and 14. Section three includes the putting green on hole 6 and holes 10 and 18. Section four is defined as holes four, seven, eight and 16. Section five includes holes three, nine, 11 and the practice area.

Task	Mon.	Tues.	Wed.	Thurs.	Fri.	Wknds.
Mow greens	X	X	X	X	X	
Change holes	X	X	X	X	X	
Flymow around bunkers				X		
Trim bunker faces				X		
Empty trash cans	X	X	X	X	X	
Hand-rake greenside bunkers	X	X	X	X	X	
Hand-rake fairway bunkers	X	X	X	X	X	
Weed around trees	As needed all week days					
Paint hazards					X	
Sand tee divots	X	X	X	X	X	
Sand fairway divots	X	X	X	X	X	
Set up tee markers	X	X	X	X	X	
Trim tee and fairway yardage markers					X	
Edge cart paths	X	X	X	X	X	
Check tee towels – change if dirty	X	X	X	X	X	X

BY DARA M. PARK, PH.D., AND KELSEY L. GORMAN

Cycling water sources

Freshwater affects saline-irrigated bermudagrass' quality and soil salinity

Water conservation is on everyone's minds these days. Proper water management ensures freshwater for human needs, the protection of ecosystem integrity and the sustainability of products (e.g., aquaculture) and services (e.g., recreational) provided by freshwater ecosystems (Richter et al. 2003). Considering less than 1 percent of the world's freshwater is accessible, according to the World Health Organization, and the world's increasing population (the World Water Council expect a 40- to 50-percent increase within the next 50 years), if water conservation isn't taken seriously, we're in trouble.

Subsequently, strict water regulation and restrictions are inevitable and on the horizon.

Using alternative water sources is one conservation mechanism that's becoming more popular. These sources include reclaimed wastewater, tidally influenced streams and rivers, reclaimed stormwater runoff and saline groundwater aquifers. In a national survey taken in 2007, 15 percent of all surveyed golf course facilities began using an alternative water source since 1996 (Lyman et al.).

While this is by far one of the most innovative and practical techniques to reduce freshwater use, using alternative water sources can be challenging to manage. For example, the No. 1 problem superintendents typically face when using reclaimed wastewater is salinity (Dion and Ray, 2008; Cisar et al., 2005). Actually, most of the alternative water sources mentioned above have some amount of solutes that must be controlled to maintain quality turfgrass. Even reclaimed stormwater runoff can have high amounts of salts (because of salt that's applied to roads to melt ice and other factors).

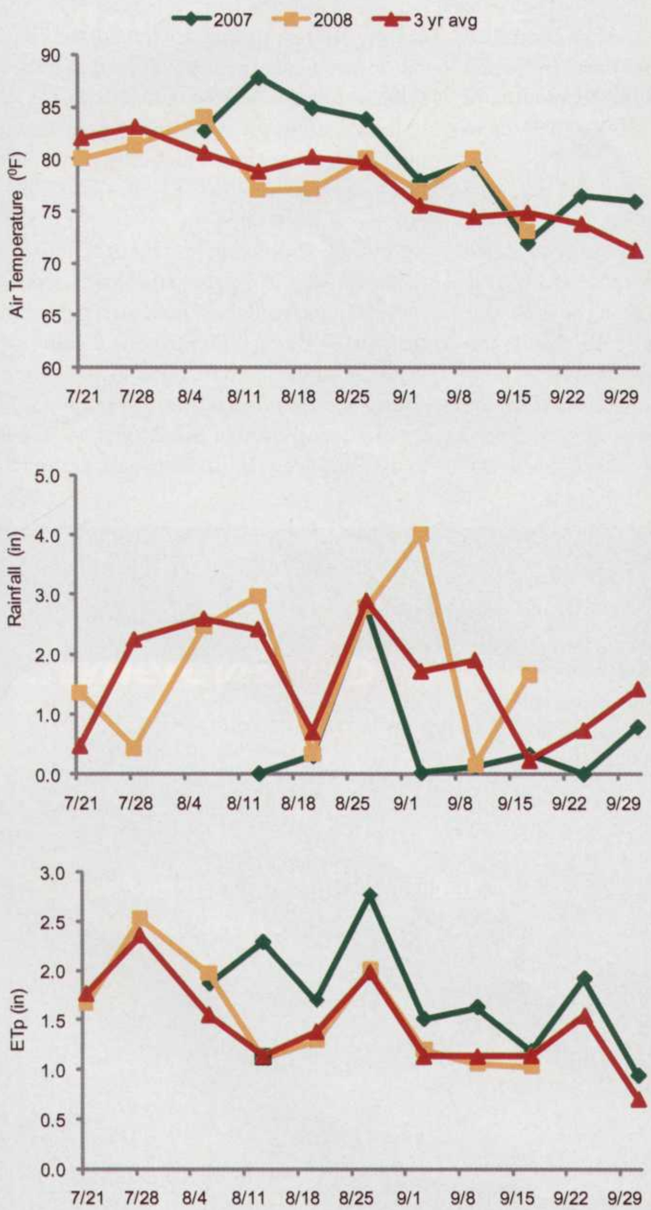
Past field-scale research about the potential and management of using saline water sources to irrigate golf course grasses has been conducted primarily in the Southwest with relatively little research conducted elsewhere in the U.S. This focus is most likely because of the arid conditions of the region. The research that has been conducted in the Southwest documents that the success of using saline water sources is dependent on turfgrass species (and cultivar), degree of salinity, the texture and structure of the underlying soil and management method. Ultimately, saline water can be used in many cases.

In one study, scientists maintained turfgrass by cycling saline water with freshwater for irrigation (Schaan et al., 2003). The freshwater helped dilute and leach deposited solutes from the intermittent saline water irrigations. Compared to the Southwest, irrigation in the Southeast is used only to supplement the somewhat regular rainfall that occurs throughout the year. If using saline water for supplemental irrigation, perhaps these natural freshwater irrigations (the rainfall) can act in a similar manner as what was documented in the Southwest. If so, water conservation from

Cores were collected before and after the experiment to determine if irrigating with saline water influenced stolon density and root mass.

2007 AND 2008 EXPERIMENTAL PERIODS

Figure 1. Air temperature, rainfall and predicted Evapotranspiration (ETp) during the two experimental periods and the three year average (2003-2006).



using saline water for irrigation documented in the Southwest may be conservative for the Southeast.

To test if rainfall was enough to supplement saline water irrigations in the Southeast, an experiment was conducted at Clemson University's Pee Dee Research and Education Center in Florence, S.C. The experiment was conducted for eight weeks during the summer, which is the time of least rainfall, high water demand for plants and high potable water demand along the South Carolina coast. The experiment was conducted twice, August through September 2007 and July through August 2008.

METHODS AND MATERIALS

A field-scale facility was constructed on the native loamy sand soil (Bonneau series). The facility and experiment were constructed to investigate multiple factors at any one time. This article addresses only the facility's use for investigating the influence of irrigation water source on bermudagrass quality, growth and soil salinity.

Sixteen 9.8-feet-by-12.1-feet plots were delineated and sodded with Tifway (419) bermudagrass (*Cynodon transvaalensis* Burtt-Davy x C. dactylon (L.) Pers.). The two irrigation treatments were freshwater (mean: 0.08 dS m-1, range: 0.07–0.09 dS m-1) and saline (mean: 3.19 dS m-1, range: 2.59–3.52 dS m-1) randomized with four replications. The freshwater source was from the Florence County municipality. The saline treatment stock solution was based on the salt composition of salt water off the South Carolina coast (35 dS m-1).

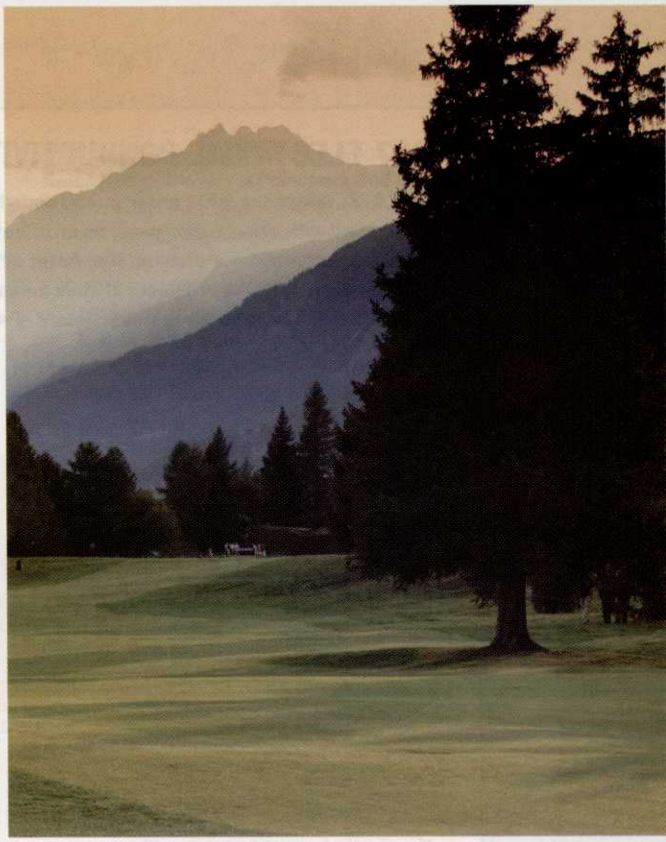
Salts were mixed in a 30-gallon mixing tank and then emptied into a 6,000-gallon holding tank in which the solution was diluted with freshwater. Each plot was irrigated using a subsurface drip irrigation system buried between 6- and 8-inches deep and spaced 32 inches apart. Irrigation was applied three times a week (Monday, Wednesday and Friday) to replace 100-percent potential evapotranspiration (ET) based on three years of pan ET data collected from a weather station located on site. If a rain event occurred resulting in greater than 0.33 inches of precipitation, the following scheduled irrigation was voided.

The bermudagrass was managed under fairway conditions, mowed three times a week (Monday, Wednesday and Friday) at a height of 1 inch. A complete fertilizer (Harrell's 18-4-6 SLR) was injected into the irrigation system at a rate of 0.25 pound of nitrogen per 1,000 square feet every two weeks to the bermudagrass.

OBSERVATIONS AND MEASUREMENTS

Every Monday, turfgrass quality was assessed visually on a scale of 1 to 9 (9 = dark green turf, 1 = dead/brown turf, and 6 = minimally acceptable turf). To assess turfgrass growth, clipping samples were collected from a 16-square-foot area from each plot before every mowing. Clippings were combined throughout the week after drying at 140 F to measure dry-weight yield (pound per 1,000 square feet).

For each year, 2-inch diameter cores were taken to a depth of 12 inches at zero and eight weeks after initiation. The pelt was removed, and stolons were counted as a quantitative means to determine density. The remainder



Effluent Water

Dirty Never Sounded So Good

Kathleen Conard
www.aquatrols.com

Reclaimed, or effluent, water is an alternative water source. It has been very popular and even mandated for our drought-stricken friends in the South and West. But with increased water restrictions, higher water and energy costs and increased political pressures by environmental groups, superintendents throughout North America may eventually be forced to consider this option.

Effluent water is domestic wastewater that has been treated to urban re-use standards at a state approved water treatment plant. It is then pumped to a re-use water holding pond at the golf course until it is needed for irrigation.

Effluent water:

- Offers a potentially endless irrigation supply, even during periods of drought. It is less expensive than potable water – even free in some areas, as long as you pay to pump it.
- It can also provide a free source of fertilizer since nutrients remain in the water.
- Research shows that turf can thrive the same with effluent water as it does with potable water (although this may require extra attention on your part), and your golfers will most likely not notice a difference.
- Use of reclaimed water shows your club and community members your commitment to water and environmental conservation.

Converting to effluent water is not without its challenges. For instance:

- Preparing your facility to accommodate effluent water can be time consuming and costly.
- Some effluent water has high pH and sodium levels that will need to be corrected with soil amendments and wetting agents, as well as aerification and topdressing.
- Effluent water portals must be clearly marked to separate them from potable water sources. In addition, potable wells and dining facilities must be a fixed distance from irrigation heads.
- Soil and water chemistry must be closely monitored, particularly carbonates, bicarbonates and salt levels.
- You may be forced to take a specific amount of water every day, even if you don't need to use it. This means that you'll have to have a holding pond or other option for storing effluent water on your course.
- Spray fields may also be necessary. These are designated areas (pastures, woods, etc.) that have irrigation heads for the sole purpose of discharging excess supply.
- The public should be notified of the use of reclaimed water at a golf course by posting signs at the holding pond and/or clubhouse, as it is not safe for consumption.
- Operating costs can vary. They are mostly associated with the power and maintanance of the pumps, which wear out more quickly than with potable water. Installation of a good filtration system is also required to help to protect your irrigation system.

Converting to effluent water may seem like more trouble than it is worth; but when faced with dwindling water supplies, increased water restrictions, higher water and energy costs, and increased political pressures, it doesn't seem so bad. It is actually a smart irrigation choice that can help you to keep your course green and help you secure water no matter what drought conditions or regulations are in your area.

The above information is a snapshot of the pros and cons of using effluent water. The money and water you'll save, as well as the positive environmental accolades you will get from regulators and your neighbors could make it worth your while. Maybe effluent water isn't so dirty after all.

Thanks to the Metropolitan Golf Course Superintendents Association and the Georgia Golf Course Superintendents Association for their editorial assistance.

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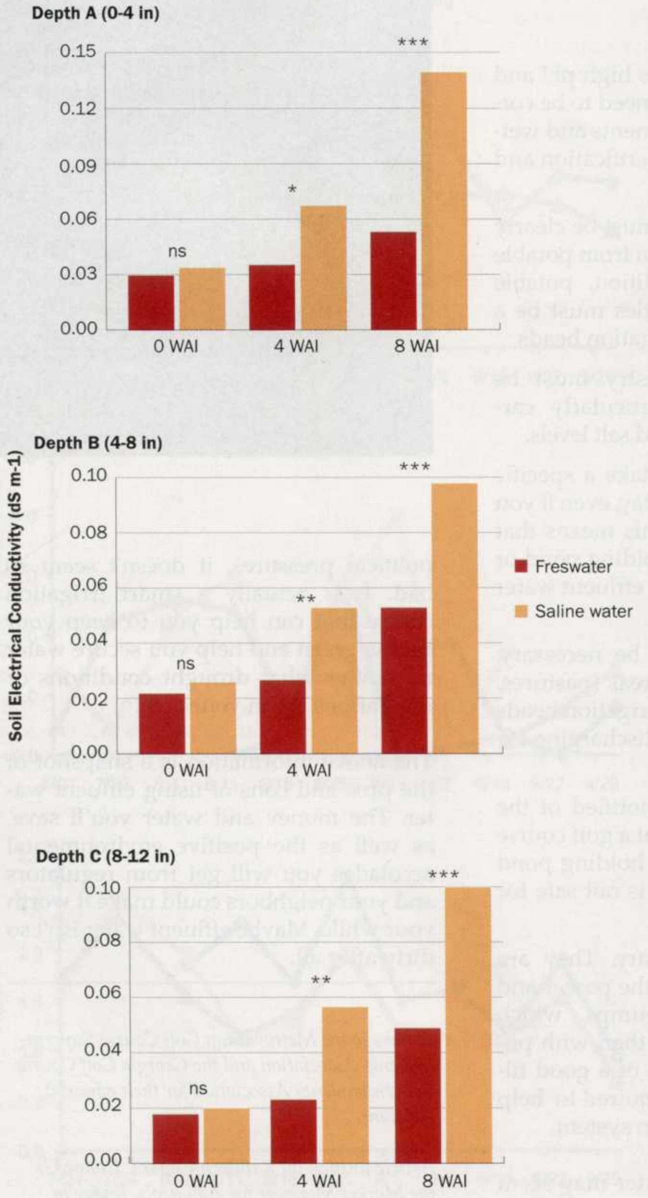
2007 ELECTRICAL CONDUCTIVITY

Figure 2. During the 2007 experimental period, soil solutes accumulated with use of saline water as an irrigation source. WAI= weeks after initiation. ns= no significant difference between treatments. Increase in the number of stars means an increase in significant differences between treatments: *=P<0.10, **=P<0.05, and ***=P<0.01.



of the core was partitioned into two samples (0 to 6 inches and 6 to 12 inches), then washed of the mineral portion leaving just roots. Washed roots were ashed and weighed to evaluate below ground growth.

To monitor soil salt accumulation, 2-inch diameter cores from the 0 to 4, 4 to 8 and 8 to 12 inches of the soil (depths A, B, and C, respectively) were collected at zero, four and eight weeks after initiation. Cores were brought into the laboratory and soil electrical conductivity (ECe) was measured from a 1:2, soil/water mixture. Irrigation and rainfall water samples were collected periodically for electrical conductivity determination.

Significant means for all measurements and observations were identified by analysis of variance using the general linear model of SAS Software (Ver. 9.1, SAS Institute, Cary, N.C.).

RESULTS AND DISCUSSION

The two summers during which this experiment was conducted represented two different types of weather patterns in the South Carolina Coastal Plains (Figure 1, page 66). Low rainfall, higher than normal temperatures and ET dominated the 2007 experimental period. According the U.S. Drought monitor (http://drought.unl.edu/dm), the beginning of the 2007 experimental period was characterized as abnormally dry. By the end of the experimental period, it was characterized as an extreme drought.

These drought conditions made for a great time to examine what would happen under a worst-case scenario. During the 2007 experimental period, an irrigation event was voided only once. In contrast, the 2008 experimental period was more similar to the region's typical weather (Figure 1). Rainfall was plentiful, and 10 out of the 24 scheduled irrigations were voided.

Although some individual plots in the 2007 experiment were rated below the minimal acceptance criterion of 6, average quality was always above 6 for both water source treatments. Generally, quality increased throughout the experimental period from an average of 7 to 7.9. Only for weeks two, four and five, did freshwater-irrigated turfgrass have greater quality (7.8, 7.3 and 7.5 for weeks two, four and five, respectively) than saline water irrigated turfgrass (6.8, 7.1 and 7.0 for weeks two, four and five, respectively). The week before these ratings, minimal to no rainfall occurred.

Weekly composite clipping yields were the same regardless of water source and ranged from 0.88 to 2.15 pounds per 1,000 square feet.

At the end of the experiment, shoot density and root mass in the upper six inches were greater from saline-irrigated bermudagrass (77.5 stolons 10 in-2 and 0.051 oz 100 in-3 for shoot density and root mass, respectively) compared to freshwater-irrigated bermudagrass (54.8 stolons 10 in-2 and 0.038 oz 100 in-3 for shoot density and root mass, respectively).

This result may sound counterintuitive, but this positive response from irrigating with low level saline water can be attributed to the adaptive mechanisms bermudagrass commences once recognizing the solutes. Bermudagrass blades have salt glands to excrete saline ions, thus the more blades the more salt glands available for solute excretion (Marcum and Pessarakli, 2006). To increase water uptake, roots elongate creating more surface area, ultimately increasing mass, too (Dudeck et al., 1983).

As expected, ECe increased during the experimental period at each depth (Figure 2). However, even the highest of ECe value (0.30 dS m-1) was below the threshold values of 9 and 12 dS m-1 in which problems begin to occur.

While the 2007 experiment was conducted during drought conditions, the 2008 experiment was conducted during more typical weather patterns (Figure 1). Although rainfall was abundant and reduced the need for supplemental irrigation, irrigating with saline water resulted in weekly average quality scores to be 0.1-0.5 points (an average of 0.2) lower than when irrigating with freshwater. Quality from individual plots was always greater than 6, and was less variable week to week during the 2008 experimental period compared to 2007's experimental period.

As in 2007, clippings weren't influenced by water source. Neither were shoot density and root mass at the lower depth. However, root mass in the upper six inches was greater in saline-irrigated bermudagrass compared to freshwater-irrigated bermudagrass (0.053 and 0.038 oz 100 in-3 for saline and freshwater, respectively). Mostly attributed to the abundance of rainfall, ECe was similar for the two water source treatments.

CONCLUSIONS

Using saline water sources for irrigation during times of high freshwater demand can considerably reduce the pressure on freshwater resources. Based on Westcot and Ayers (1985), irrigation water sources greater than 0.75 dS m-1 can begin to cause problems for soil structure and plant use.

In this experiment, bermudagrass was irrigated with a saline water source that on average was 3.19 dS m-1, thus considered a high hazard to plants and soils. Under drought conditions, there were minimal quality differences between bermudagrass irrigated with freshwater compared to saline water. During times of severe drought stress, supplemental irrigation may be necessary depending on the aesthetics requirements. When rainfall was abundant, saline-irrigated bermudagrass had slightly lower quality, but the quality was still good and more consistent over time than during the drought period. At these times, no additional freshwater irrigation would be required.

Saline water irrigations didn't result in excessive top growth; thus, superintendents can expect not to have to change their mowing frequency when irrigating with saline water. If long-term use of saline water is expected with no cycling of freshwater (regardless if it's through irrigation or rainfall), superintendents are advised to monitor their soil salinity, especially in nonsandy textured soils. **GCI**

Dara Park, Ph.D., is an assistant professor at Clemson University's Pee Dee Research and Education Center in Florence, S.C. Kelsey L. Gorman is master's candidate there.

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IMPACT
ON THE BUSINESS

Praying for rain

BY MARISA PALMIERI

Effluent water has been the primary irrigation source at the Royal Poinciana Golf Club in Naples, Fla., since 1989. The 36-hole club has a small emergency back-up of accumulated rainwater, but aside from that, it operates with 100-percent effluent water provided by the city of Naples.

At first, the facility's switch to effluent was voluntary, but now the South Florida Water Management District mandates effluent be used if it's available.

The main side effect – high sodium and bicarbonate levels – is something Matt Taylor, CGCS, pays close attention to. Taylor, director of golf course operations, says sodium levels are typically between 350 and 500 parts per million; bicarbonates register between 125 and 150 parts per million.

Royal Poinciana has Champion bermudagrass greens. One course has TifEagle tees and 419 bermudagrass fairways and roughs. The other is wall-to-wall Celebration bermudagrass.

"We test the water regularly right from the source," Taylor says about the tests that take place quarterly at least. "Then we measure what's in the soil. Between the two of those, we come up with our management plan."

The first part of the plan focuses on aerification.

"We is spike all the greens once a week," says Taylor, who has been at the club since 2000.

This practice keeps the top of the soil loose so water penetrates the surface and flushes out the sodium and bicarbonates.

Another strategy is to amend the soil. Taylor applies acidifying fertilizers to mitigate the bicarbonate issue and applies gypsum, also known as calcium sulfate, which helps move sodium through the soil.

Taylor applies gypsum once a month at a rate of 25 to 50 pounds per thousand square feet, depending on sodium levels.

In a perfect world, the club would have a dual system to cycle in freshwater occasionally, but it doesn't have the ability to do that because freshwater isn't available.

"Some superintendents try to run additional effluent water through to try to flush the greens that way," Taylor says. "We've tried that in the past, but I'm not sure how successful that is. You're just putting down more sodium and bicarbonates and potentially flushing the nutrients through, too. I'd rather regulate it with gypsum and pray for rain."

The Naples region receives about 53 inches of precipitation annually.

"When it rains, you can definitely tell," Taylor says. "If you get a half inch during the season, it brightens things up." GCI

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PREPARING FOR INTERVIEWS

The new year is a time to assess your golf course, budget, labor, finances and future. This assessment may lead to exploring other employment opportunities.

The outlook for the 2009 job market may be bleak, but a well-prepared resume may separate you from others. If you advance to the interview process, be creative, politely persistent and as professionally detailed off the golf course as you are on. Your agronomic knowledge and talent may not guarantee success, but other factors might.

Here are a few examples:

1. Identify when, where and who is conducting the interview.

• Use the Internet to research and learn about the background and personal characteristics of those conducting the interviews. Study their backgrounds to establish traits and philosophies that may assist you with your preparation and help determine if you wish to pursue the opportunity.

• Check the references of those interviewing you.

• Plan travel time appropriately to avoid unexpected delays.

• If the interview is in the clubhouse, find out if it will be in a large board room, small office or both. This will aid you when presenting your information. Practice your delivery in a similar environment.

2. The adage, "You never get a second chance to make a good first impression" is vital to your preparation. Review your personal traits, characteristics and etiquette for meeting and greeting people.

• When meeting people for the first time, demonstrate initiative, passion and energy for the position. The individuals will know immediately if you're interested and honest in your pursuit of the opportunity.

• Honestly review your personality shortcomings and avoid having them surface at an inopportune time. Look people in the eyes, speak slowly, keep your hands still and quiet, avoid terms such as "you know," "like" and "um," and allow people to finish their sentences without interrupting.

• Know hand-shake protocol and respect certain guidelines. If the person is older than you are, wait until his hand is extended, firmly grasp the hand using a light grip, give a modest pump and let go. In a business setting, the rules are the same whether the person is male or female. Always shake a hand that's extended to you.

3. Review and establish your nonagronomic qualifications. More interview committees wish to determine your qualities beyond turf knowledge.

• Be prepared to discuss and outline personal management philosophies about your staff, the club's professional staff, other employees and club membership.

• Be fluent when discussing finances, ordering protocol, record-keeping, employee/member discipline and membership reactions to your plans and objectives.

• Understand the protocol of conducting a meeting, whether it's a green committee meeting, board meeting or staff meeting.

• Focus on organizational skills – they'll identify you as a professional manager.

• Often, a committee's first interaction with a candidate is through the computer. Being well versed in all aspects of electronic management and communication options is critical to advancement.

4. Be one step ahead of the competition. If the club forwards you a package containing its history, background, design philosophy, budget and operating information for your review, read it thoroughly.

• If the club sends you its operating budget, review and revise it to meet your forecasted operational needs.

• Become as familiar with the property and golf course as possible before the interview. If possible, visit and walk the property in advance. Download an aerial image of the property from Google Earth to review the topography, especially if it's raining, to observe surface run-off.

• If the incumbent superintendent is no longer employed, visit the maintenance facility, pump station, irrigation controllers and turf nursery.

• Investigate perimeter properties and the club neighborhood to determine if there are any potential outside agency impacts or intrusions.

• Bring a compass for determining sun angles, shade cast from trees and where you may encounter winter damage if in a Northern climate.

• Bring a soil probe and turf thermometer to uncover any malady not unveiled in the interview process.

5. Clothes can make or break first impressions.

• Determine when and where you'll be interviewed, and dress accordingly. Many interviews involve a walk around the golf course with committee members. Don't wear a suit in this situation. Bring your suit if the walk is followed by the interview. Request the host club allow you to change in its locker room.

• The attire for the walk is business casual. Wear dress slacks, a collared shirt with a tie and your logoed club sweater or wind shirt, plus clean footwear.

• The formal interview is the time for a business suit. Make sure it's current and stylish, with no loud or unusual patterns or colors. Most importantly, your suit must fit. Poor-fitting attire indicates lack of concern or discipline.

• Match shoe color with belt color.

• Shine your shoes. If you pay attention to detail on the golf course, do so off the golf course.

6. Personal grooming is the final touch for the dress-to-impress aspect of the interview.

• A timely haircut allows your crop to be at its best. Don't head to the barber the morning of the interview.

• Be clean shaven. If you have facial hair, be sure it's trimmed and neat. Always trim nose and ear hair.

• Remove soil underneath your fingernails.

Being prepared professionally off the golf course requires logic, forethought and consideration of others. **GCI**