

## Beat the Heat

Water treatment helps golf course control pH and maintain healthy turf during Texas drought

**Y**ou can't predict a record-breaking heat wave and drought, but you can plan for it. That's what helped Stonebridge CC, a private club in McKinney, Texas, soften the blow of one of the worst Texas summers in recent history.

You may remember scenes from the national news last summer. As the drought-related damage to the state's economy neared \$5.8 billion, most eyes were focused on the plight of Texas farmers and ranchers. But many more businesses were affected, including golf courses.

### Problem

Keeping a golf course green and healthy in the summer scorch, which means carefully controlling water pH and sodium levels in soil

### Solution

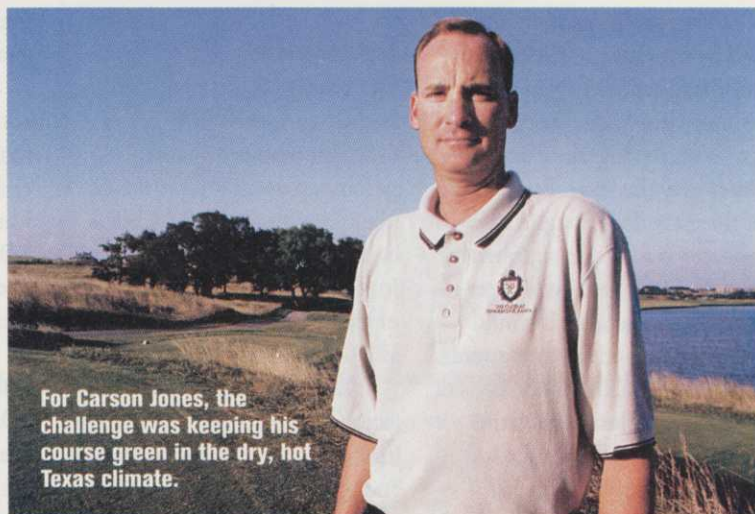
Use of a urea, sulfuric acid water treatment injected into irrigation water to sustain nutrients and preserve turf

### The problem

For superintendents such as Stonebridge's Carson Jones, the challenge was keeping courses green with minimal rainfall as daytime temperatures topped 100 F for much of the summer. Jones and other area



By lowering the soil pH, Jones says he's observing better soil percolation.



For Carson Jones, the challenge was keeping his course green in the dry, hot Texas climate.

PHOTOS: ROB WYTHE

superintendents learned it was not so much a matter of getting adequate water, but managing it. The combination of heat and drought altered the source of irrigation water for many and changed water and soil chemistry in ways that placed a strain on turf health.

At 260-acre Stonebridge, the drought heightened previous soil and water problems that had been intensively managed since the 18-hole, Pete Dye-designed course opened 11 years earlier. "When we opened, our water came entirely from deep wells, and its quality was very poor," Jones says.

A water sample taken in 1988 showed a pH of 8.7, a sodium level of 377 parts per million, a Sodium Absorption Ratio of 31, and a bicarbonate level of 346 ppm. From that starting point, Jones and his crew sought water and soil pH levels in the 7.0 to 7.2 range, and a SAR reading of five or lower. Unless those goals were met, the course would suffer continuous turf loss.

### Background

Water pH is especially important to

golf courses, says Ali Harivandi, Ph.D., the University of California and a leading authority on soil and water issues relating to turf management. Water pH can affect soil pH levels, and in high pH soils, such as 8.0 and above, chemical complexes form that tie up micronutrients like zinc and iron.

"On the other hand, if soil pH is adjusted to a very low level, toxicity problems can occur," Harivandi adds. "Aluminum in the soil can become more soluble at low pH levels, causing aluminum toxicity."

High sodium in irrigation water causes other problems. "If water has high levels of sodium, the soil becomes more sodic," Harivandi says. "That can inhibit water penetration."

Jones confirms this, saying soil crusting caused significant turf loss at Stonebridge shortly after the course opened. At that time, Jones was also concerned about salt buildup in the course's greens.

Bicarbonate is another enemy. It's a negatively charged ion that can combine with the soil's naturally occurring calcium and magnesium

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## Maintenance

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to create insoluble precipitates, which can fill soil pores and decrease water infiltration and percolation.

These problems were intensified by the drought. Because of poor water quality from the course's deep wells, Stonebridge had been relying more on lake water over the years. But because of the extended drought, the course was forced to supplement the lake water with well water — with the danger that it would make greens and fairways more sodic and contain higher levels of bicarbonates. Jones knew the procedure could harm the soil structure by leaving little air space for roots, with little potential for rhizome development.

On top of everything, there

was heat stress. "It's tough enough to grow bentgrass here in the summer," Jones says. "The heat stress, with the salt-affected soil, was a recipe for disaster."

### The solution

Stonebridge could maintain healthy turf, even during the drought, thanks in part to pHairway, a water treatment manufactured by Brea, Calif.-based Unocal Agriproducts. Jones began a program to inject pHairway into irrigation water as it's applied to the course.

The water treatment is manufactured by reacting urea and sulfuric acid in a carefully controlled and patented process. The urea and sulfuric acid form an adduct that considerably reduces the acid's corrosivity, but with-

out changing its total acidity.

pHairway is highly oxidized and will oxidize other elements in soil. It will temporarily lower water and soil pH to bring elements like iron, zinc and manganese back into solution.

Stonebridge has injected about 3,000 gallons of pHairway fertilizer into its irrigation water each year since the late 1980s. During 1998, it used more than 4,000 gallons of the pHairway-injected water because of its greater reliance on well water.

### Outcome

"Our primary objective is to keep soil nutrients in solution so they remain available and to flush impurities through the soil profile," Jones says. "By lowering the pH of our water and, in turn

our soil, we solubilize the calcium naturally existing in the soil. That dislodges sodium ions so they can be leached out."

Use of the amendment also has Jones using less fertilizer. pHairway fertilizer contains a nitrogen constituent and also makes the applied fertilizer more available to the plant. "So we're getting a lot more efficiency from the fertilizer that we do apply," Jones says.

Finally, by lowering the soil pH, Jones says he's observing better soil percolation. The removal of sodium and bicarbonates from the soil profile allows improved water infiltration, which controls disease.

For Jones, the process was a successful way to beat the heat deep in the heart of Texas. ■

## The Company Line

### ■ PRODUCTS & SERVICES

#### ► Utility vehicle

The Jacobsen Hawk, from **Textron Turf Care And Specialty Products**, is a medium-sized utility vehicle designed to meet a range of golf course applications. The Hawk features a heavy-duty steel frame with reinforced front suspension, a rugged transaxle and rack-and-pinion steering. The Hawk is available in gas and electric models.

Textron also offers its FlashAttach System to cut reel changing time to seconds. It's designed for the Jacobsen Greens King V triplex greens-mower and the LF-128 and LF-3400 lightweight fairway mowers. With the system, an operator can quickly switch to a seven-blade reel for mowing tees after mowing greens with an 11-blade reel without using tools.

For more information, contact Textron Turf Care And Specialty Products at 888-922-TURF, [www.jacobsen.textron.com](http://www.jacobsen.textron.com) or

CIRCLE NO. 200



#### Deer repellent

**Soil Technologies Corp.** is distributing Deer-Off, a patented dual-deterrent system that will deter deer from eating plants and flowers on golf courses. The product, made from natural, biodegradable food products, leaves an odor and taste that deer find offensive. It contains no harmful chemicals. For more information, contact 800-221-7645, [www.fairfield.com/soiltech](http://www.fairfield.com/soiltech) or

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#### Flower boxes

The Ultimate Flower Box from **Flower Framers** is an easy-care planter box that won't rot, chip or break, according to the company. It can be used as a permanent planting fixture or a portable display.

For more information, contact Flower Framers at 800-315-1805, [www.flowerframers.com](http://www.flowerframers.com) or

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#### Software

**Questar Productions LLC** offers World Construction Set Version 4.5, software for computer simulations of golf course designs. It features Animated 3D Object and Terrain Texturing to create buildings, vehicles, roads and terrain features. Grass, rock, gravel, stone, brick, wood and other textures can also be created.

The software can help superintendents create guides or maps of their courses or help them visualize proposed changes or maintenance plans. For more information, contact Questar Productions LLC at 303-659-4028, [www.questarproductions.com](http://www.questarproductions.com) or

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#### ▲ Moisture meter

**Dynamax Inc.** offers the TH20 Theta Moisture Meter, a new way to measure volumetric soil moisture content. It combines ease of use and accuracy with low cost to give growers access to precise soil moisture data, according to the company. The probe is reliable, even in saline soils, and its compact size means minimal soil disturbance. For more information, contact 281-564-5100, [www.dynamax.com](http://www.dynamax.com) or

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