

a distinct pattern, superintendents can rest assured the problem was in the application or the applicator.

"If you see something that looks like a pattern, it's time to check your records to see what you sprayed," says Darin Bevard, a USGA Green Section agronomist based in West Chester, Pa. "It's definitely an 'uh-oh' moment."

Bevard says superintendents should look for discolored turf. If they're lucky (as Gurke was), the phytotoxicity will be limited to the leaf tips. He also recommends looking for wilt and lack of vigor. Armand LeSage, certified superintendent at Lake Arrowhead (Calif.) CC, says superintendents can tell if they're experiencing phytotoxicity if nothing they do with water, fertilizer or iron brings the turf back.

"It's not as if I see this on all my visits," Bevard says. "It's a one in 20 occurrence — 5 percent of my visits each year. I don't see true catastrophes more than twice a year. But when it happens to you, it will seem like a catastrophe whether it is one or not."

LeSage offered this tongue-in-cheek consolation to his colleagues who experience severe phytotoxicity, "At least you don't have to worry about disease because the turf is too dead to be a host for the pathogen."

Though there are occasional cases of phytotoxicity caused by other pesticides, by far the majority of cases are caused by misapplied herbicides, says Matt Nelson, a USGA Green

Section agronomist in its Twin Falls, Idaho, office. "More often than not, it's an herbicide applied at the wrong rates at the wrong time," Nelson says.

### Read the label

You'd think that reading the labels on chemicals before spraying should go without saying. But expert after expert make the point that superintendents don't always do the obvious.

"We aren't chemists," says Scott Welder, superintendent of the Lake Buena Vista Course at Walt Disney World in Orlando. "It is upsetting when people tank mix chemicals without reading the label because it gives the entire profession a black eye.

"The chemical manufacturers have spent millions of dollars to research what mixes are acceptable and which aren't", he adds. "We should always follow the label recommendations as it is the law."

Todd Lowe, a USGA Green Section agronomist in Rotunda West, Fla., says superintendents should pay special attention to specified turf varieties and rates.

"When we get reports of phytotoxicity in our region, it's often applicator error," Lowe says. "Sometimes you also see superintendents use a product on their greens that is labeled for fairways or apply chemicals during periods of high heat and humidity. These can all cause phytotoxicity."

But it's not just applying a chemical on the wrong turf that can cause problems. Sometimes, something as simple as misreading a decimal point can cause trouble. Nelson tells the story of one unfortunate golf course in the Northwest where an applicator misread the decimal point on a sulfur application. Instead of applying 1 pound of sulfur per 1,000 square feet, the applicator applied 10 pounds of sulfur per 1,000 square feet. The result was fried tees.

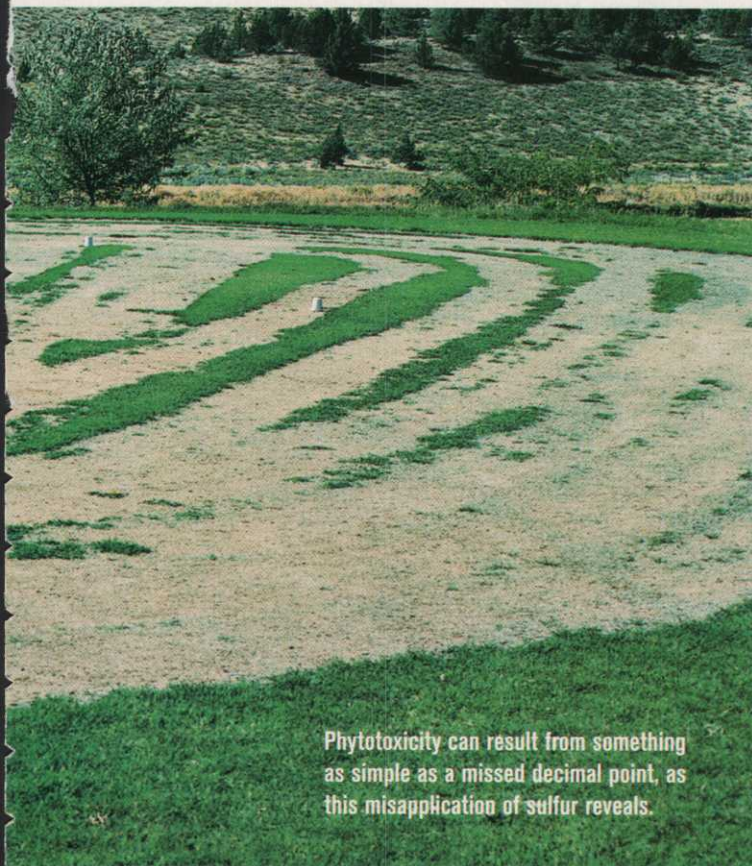
"Most of the time, superintendents are doing their homework, but people like to tank-mix and sometimes that hurts them," Nelson says. "If you're careful and read the labels, you shouldn't have too many problems."

### Watch the weather

Jim Seaman, certified superintendent of Shaker Ridge CC in Colonie, N.Y., watches weather reports religiously. In upstate New York, the weather has a tendency to change quickly, and Seaman is always concerned about the effect of such variables on his chemical applications. But around Thanksgiving two or three years ago, the weather bit Seaman anyway despite his best efforts to avoid weather-related problems.

Seaman says he applied PCNB to his greens at temperatures well within the constraints listed on the label to control snow mold. Unfortunately, the temperatures soared to levels much higher than would be expected in early December (the famous Indian summer effect) in his region.

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Phytotoxicity can result from something as simple as a missed decimal point, as this misapplication of sulfur reveals.

LARRY GILHUI/USGA

## Phytotoxicity

*Continued from page 61*

As a result, two greens at high elevations in direct sun were burned slightly.

"It's good that I didn't use the highest rates, or I would have had worse problems," Seaman says.

### The end game

So what can superintendents reasonably do to avoid becoming the next victim of a phytotoxic problem? Aside from those mentioned above, here are some other common sense guidelines superintendents should follow:

#### Train spray technicians adequately or give them their instructions in writing.

Lowe says superintendents should make sure everyone knows the chemicals applied and what constitutes proper application protocols.

"They should check the sprayers to make sure they're properly calibrated and make sure the tanks were washed out properly so they're not dealing with residues from other chemicals," Lowe says. "You don't want inexperienced people out there spraying these chemicals, so make sure they know what they're doing."

Bevard suggests putting application instructions in writing for spray technicians before they go out.

Gurke says training employees is the most important step superintendents can take to prevent phytotoxic problems.

"If you don't train them correctly, you'll be the fall guy when something happens," Gurke says. "So it's in your best interest to train them well."

#### Use enough water.

Seaman says one of the most common mistakes superintendents make is not using enough water to dilute the chemicals. He recommends using at least 2 gallons of water per 1,000 square feet of turf. Bevard says he agrees with Seaman's figure as a guideline, but it's not a hard and fast rule.

"If you don't use enough water, you can end up putting out chemicals in much higher concentrations than you intend," Seaman says. "Most labels will give those guidelines, and superintendents should follow them."

"It really depends on the product," Bevard says. "The label will usually provide guidelines for the minimum amount of water to be used during application."

#### Test any tank-mixed combinations on inconspicuous areas of the course.

Welder tells fellow superintendents that they shouldn't gamble on their greens. If tank-mixing is vital, first check the label, with the supplier or with fellow superintendents.

"You can do the 'jar test' to determine if the chemicals are compatible, but it won't tell you if you have a potential phytotoxicity problem," Welder says. "Some chemicals are



**"It's a good thing I didn't use the highest rates or I would have had worse problems."**

JIM SEAMAN  
CERTIFIED SUPERINTENDENT  
SHAKER RIDGE CC

synergistic with others, but this can normally be found on the label. If I was dead set on applying an exotic tank mix, I would first test it on the sod nursery."

LeSage says he once did a test to see if the advice of a mentor about mixing insecticides with fertilizer on his nursery was true. He killed most of the turf with his test.

"I'm glad I didn't try it on my course," LeSage says. "I like my job."

#### Go with your gut instinct.

If superintendents don't feel comfortable with an application, they shouldn't make it, Bevard says. Superintendents should call the distributor or company representatives to ask for guidance if there are any doubts about how chemicals will react. "You can save yourself a lot of heartache if you ask before you apply," Bevard says.

He also suggests superintendents find out the exact mode of action for the chemical before they "fix" the problem. Some solutions can actually make the problem worse.

For example, if a herbicide is taken up through the roots, trying to water it in will exacerbate the problem as it's forced through the root zone. "Doing nothing may not be the worst option," Bevard says.

#### Be honest with the golfers.

Gurke says superintendents must resist that temptation to deflect blame when applicator error causes a phytotoxicity problem.

"You want to get ahead of the story and get everything out in the open," Gurke says. "Knowledge is the most potent weapon you have against unfounded rumors about what happened on your course."

If superintendents try to cover up their mistakes, it will only cost them in the long run, Gurke says. He was honest with his golfers when he accidentally smoked the fairways, and it paid off. There weren't calls for his head, and his integrity remained intact because he admitted his mistake.

"It only takes one time for your members to discover you're lying," Gurke says. "After that, they'll never believe anything else you say." ■



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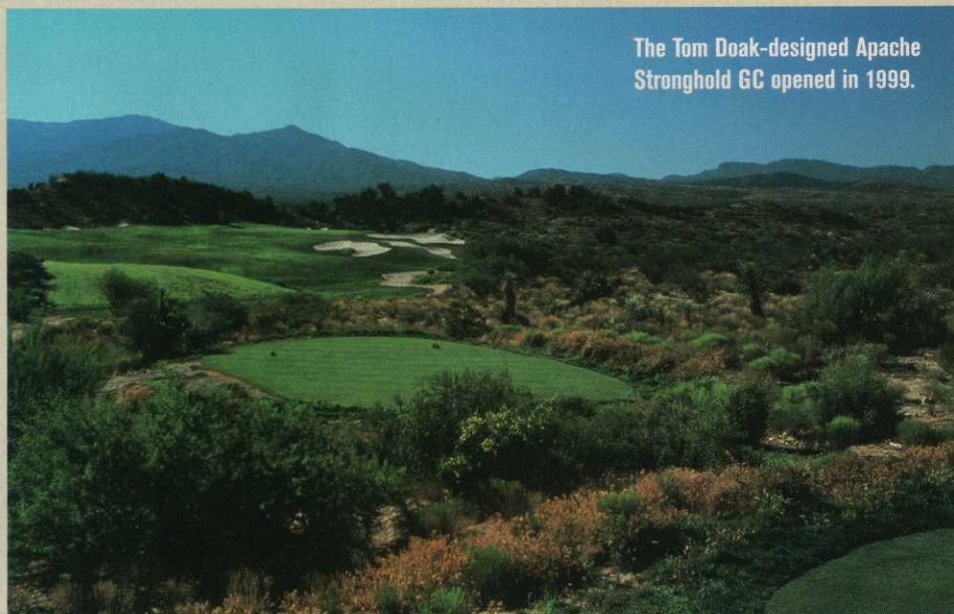
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CIRCLE NO. 128

# Righting A Wrong

It was a bad idea to grass the new fairways at Apache Stronghold in Arizona with a cool-season mixture of turfgrass. So it's back to bermuda to get the award-winning course back on track

BY SHANE SHARP



The Tom Doak-designed Apache Stronghold GC opened in 1999.

PHOTOS COURTESY OF APACHE STRONGHOLD GC

### Problem

An experimental turf combination of cool-season grasses in the fairways of Arizona's Apache Stronghold GC proved to be a major mistake.

### Solution

Go with what works best in the region — bermudagrass. The course's decision-makers researched several varieties and opted for a blended seeded variety of Riviera and Yukon.

**T**he boom of casino resorts on Indian reservations in Arizona and other Western states began in earnest over a decade ago as an attempt by tribes to establish additional revenue streams. By the mid 1990s, a number of tribes had added resort and daily-fee golf courses in an attempt to lure more high-end customers to their facilities.

The 13,000-member San Carlos Apache tribe in Arizona followed this formula to a letter — first with the opening of the Apache Gold casino motel complex in 1994 and then with the opening of the Apache Stronghold GC in 1999.

However, when it came down to choosing a turfgrass for its Tom Doak-designed

layout, the San Carlos Apaches took anything but the traditional track. A consulting team, in conjunction with the Arizona Golf Association, recommended that Apache Stronghold plant a cool-season grass mixture of ryegrass, bluegrass and fescue in the fairways.

Conventional wisdom holds that courses in southern Arizona use bermudagrass on fairways in the summer overseeded with ryegrass in the winter. Even Doak and his turf consultant recommended that the entire layout be grassed with bermuda until healthy strands of bentgrass were developed for year-round use.

But the AGA and the consulting team saw an unique opportunity to save money

on grass seed and to bolster business by enticing golfers from the bustling Phoenix area to the course's remote location. The cool grass mixture, they believed, would enable the course to avoid the traditional fall overseeding period and the typically tumultuous transition back to bermuda in the summer.

### The problem

Apache Stronghold is situated about two hours east of Phoenix at an altitude of just more than 3,000 feet above sea level. Summer temperatures are 10 to 15 degrees cooler than in the Phoenix metro area, and winter frosts are common.

The majority of courses in southern Arizona are located between 1,000 and 2,500 feet above sea level, and courses in central and northern Arizona fall anywhere between 3,500 and 7,000 feet. In other words, there was no clear-cut turf selection model to follow for tribal officials, the AGA and the consulting team.

"We are at 3,200 feet, probably just 800 feet too low to make it (the winter mixture) work," says superintendent Ron Mahaffey, who was hired at Apache Stronghold in November 2001 after a five-year stint in the consulting business. "We don't know of anyone in Arizona that had attempted this."

The experimental turf combination led to gradual turf loss each summer until the issue finally came to a head last summer. The winter grasses began to wilt and die in the face of triple-digit heat, and it was clear wholesale changes needed to be made.

According to Mahaffey, the only hole that retained "acceptable" playing conditions was the seventh, which was originally turfed with bermudagrass. Two other holes contained significant amounts of bermuda, and both were flourishing in the summer heat.

### The solution

Apache Stronghold had recently been included in *Golf Magazine's* vaunted Top 100 You Can Play rankings and was rated as the No. 1 public access golf course in Arizona by *GolfWeek*. Yet when golfers made the trek from the Valley of the Sun to the San Carlos Apache Reservation to play Apache Stronghold, they were miffed at the conditions. The pressure to remedy the misguided

turf prescription was immense.

Toward the end of last summer, Mahaffey oversaw stringent soil analysis that revealed nutrient imbalances including excessive sodium and extremely low magnesium levels. The soils had compacted, and Mahaffey attempted to dry the course only to find that the head spacing on the course's irrigation system was such that it created alternating wet and dry spots.

He and his staff also ran pathology tests and found several diseases at work — none of which were aggressive enough to be a problem if the turf had not already been under considerable stress. To remedy the irrigation and soil issues, all of the heads on the par-3 holes' greens, green banks and tees needed to be respaced.

"Basically, what we found was a poorly spaced irrigation system, compacted soils and nutrient deficiencies that stressed the cool-season grasses and enabled turf diseases to drive the final nail in the coffin," Mahaffey says. "After a thorough investigation, we decided to start moving heads. Money is not an issue. Time is what we are fighting."

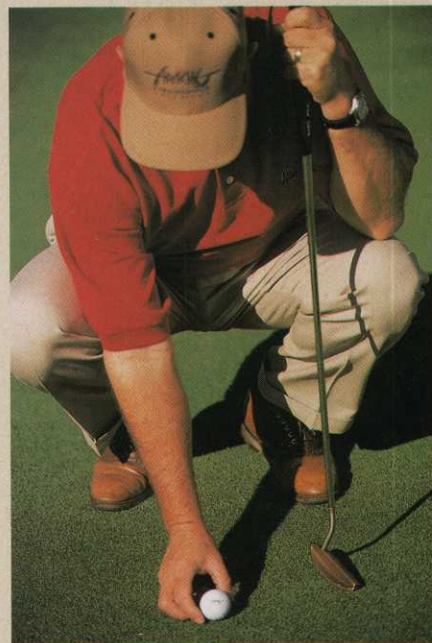
As far as turfing options go, Apache Stronghold is shunning innovation now for a proven commodity.

"We sat down with our corporate board and recommended that we go with bermuda in the fairways until we are confident we can transition to bentgrass in a few years," Mahaffey says. "We researched which varieties we wanted to use and we opted for a blended seeded variety of Riviera and Yukon."

Riviera and Yukon have both performed well in recent National Turfgrass Evaluation Program studies. Mahaffey says fairways will start being seeded at the end of May and the beginning of June. Because he's using a seeded variety, the course won't have to be closed, Mahaffey says.

To provide improved playing conditions for the remainder of last winter and the current spring season, the Apache Stronghold

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**Superintendent Ron Mahaffey and his staff have developed a simple goal for the summer of 2003: Establish the best bermuda fairways possible so golfers come back to Apache Stronghold in droves.**

**Read another  
Real-Life Solutions  
on page 88.**

## Real Life Solutions: Apache Stronghold GC

**“We just need to work on our soil, get our bermuda in and re-establish this course as one of the best in the state.”**

RON MAHAFFEY,  
SUPERINTENDENT,  
APACHE STRONGHOLD GC

*Continued from page 65*

maintenance crew patched up the course's scars with lush stands of winter ryegrass.

### Outlook

Mahaffey and his staff have developed a simple goal for the summer of 2003: Establish the best bermuda fairways possible so that golfers come back to Apache Stronghold in droves. Then, Mahaffey says, players will gain an understanding and appreciation of the overall quality of the award-winning layout.

“The design here is awesome, the surroundings here are awesome and a lot of the things that we have been beat up about have to do with conditioning, and that will be taken care of soon,” Mahaffey says. “I believe American golfers are spoiled because they expect PGA Tour event-like conditions every day. If a course is not perfectly maintained or overseeded at extreme rates, the condition of the course gets knocked. Our architect believes in old-world type grassing. That means seeding several species and let what grows

grow. Here we will be bermuda in the fairways with rye and blue mixed in.”

Mahaffey believes the selling point of the course will ultimately be its summer conditioning — the very albatross around the neck that nearly brought Apache Stronghold to its knees. Because winter temperatures on the reservation are cold enough to drive ryegrass into dormancy, Apache Stronghold will never be able to outcondition Phoenix and Scottsdale in January and February. But cool summer nights will allow the course's bentgrass greens and new bermuda fairways to flourish.

“We are working aggressively on our soils,” Mahaffey says. “We have a gravelly, loamy soil, and we are going to aerify it in an attempt to improve the soil structure. We have good surface drainage, but we just need to work on our soil, get our bermuda in and re-establish this course as one of the best in the state.” ■

*Shane Sharp is a free-lance golf writer based in Charlotte, N.C.*



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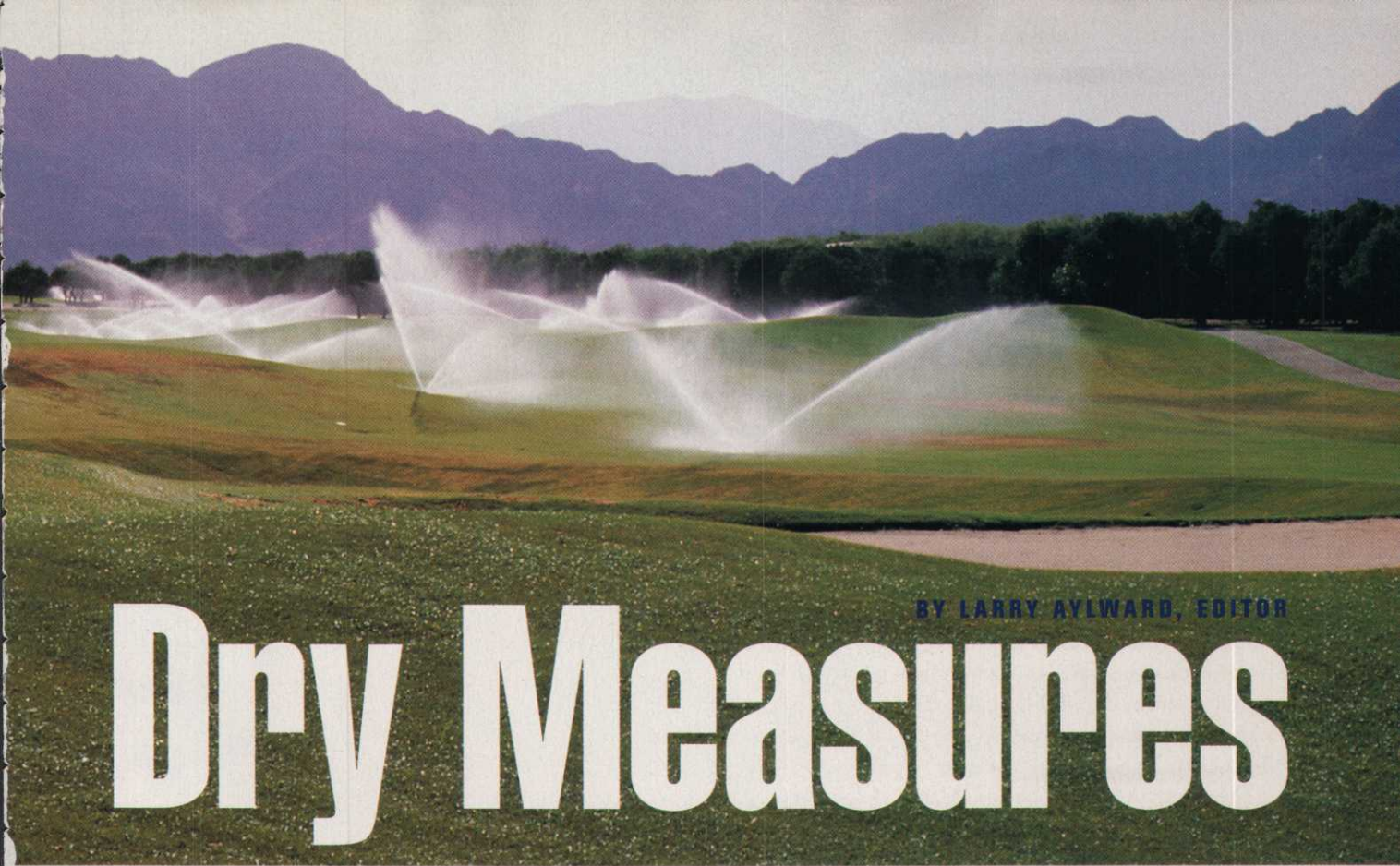
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BY LARRY AYLWARD, EDITOR

# Dry Measures

Superintendents  
must manage  
the agronomics  
and politics  
that come  
with drought  
restrictions

A

few times last summer, superintendent Stuart Sharples thought his golf course was cooked — literally.

“A couple of times I went home thinking the course had had it,” says Sharples, superintendent of the 27-hole Blue Hill GC in Nanuet, N.Y. “A couple of the fairways were turning blue.”

It was an intensely hot summer in Nanuet, about 20 miles north of New York. Rockland County, where Nanuet is located, instituted a Stage Three water restriction in the spring that lasted several months.

Sharples was under pressure to tend turf using 20 percent less water for almost the entire golf season. “We had to come up with a water conservation plan,” he says.

It was more than that, though. Sharples had to come up with a turf survival plan, especially on fairways and tees where he wasn't allowed to water during the day.

Sharples wasn't the only superintendent whose golf course had to function under a water restriction last year. He had a lot of company nationwide. About half the country was affected

by drought in 2002, and nearly 30 states experienced below-average rainfall, according to the National Oceanic and Atmospheric Administration. Jim Barrett, president of the American Society of Irrigation Consultants, says water regulation activity increased throughout the country in 2002 because of widespread drought conditions. Regulations increased at all levels, including federal, state and especially local, Barrett says.

When things got bad, they were really bad. In Denver, the city's parks department opted to close five municipal courses in January for two months because of Colorado's terrible drought. City leaders decided to bite the bullet and lose more than possibly \$500,000 in round revenue to preserve the courses whose ground is cracking and turf is dying.

The drought doesn't just hurt turf, either. Brian Vinchesi, an irrigation consultant in Pepperell, Mass., says the 2002 drought hindered the images of the irrigation and golf industries.

“Outdoor water users are under increased pressure,” Vinchesi told attendees of the International Irrigation Show last October in New Orleans. “The drought certainly increased the awareness of how much water the irrigation

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MIKE KLEMM

## Dry Measures

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industry uses. The drought highlighted irrigation as the bad guy in outdoor water use."

That means golf courses. But as Sharples proved at Blue Hill, the golf industry can do its part to abide by water restrictions, conserve water and keep courses in good condition during dry times.

Carol Silverstein, a member of Blue Hill GC's Advisory Committee, says Sharples managed to keep the public track in "pristine condition" despite the water restriction, which made his job almost impossible, she notes. The modest Sharples took the water restriction in stride, and says he did what he had to do to keep the course in good shape at 80 percent of its normal water use.

The county told Sharples and other area superintendents that they could only irrigate their courses from 9 p.m. to 6 a.m. Basically, the water restriction barred Sharples from syringing fairways, tees and greens — although Sharples and his crew were allowed to syringe greens once a day.

"Normally, and depending on how hot it is, we turn the sprinklers on one to three times a day for three to four minutes to water the greens," Sharples says.

With full-fledged syringing no longer part of the irrigation plan, Sharples needed to do something to protect the turf during the day since he knew it would be weakened because of lack of water. He instituted two simple and effective rules of his own. First, he decided to raise the height of cut on fairways and tees from five-eighths of an inch to three-fourths of an inch. Second, he decided to restrict golf cars to cart paths only, except for handicapped golfers. Both rules made for less stress on the turf.

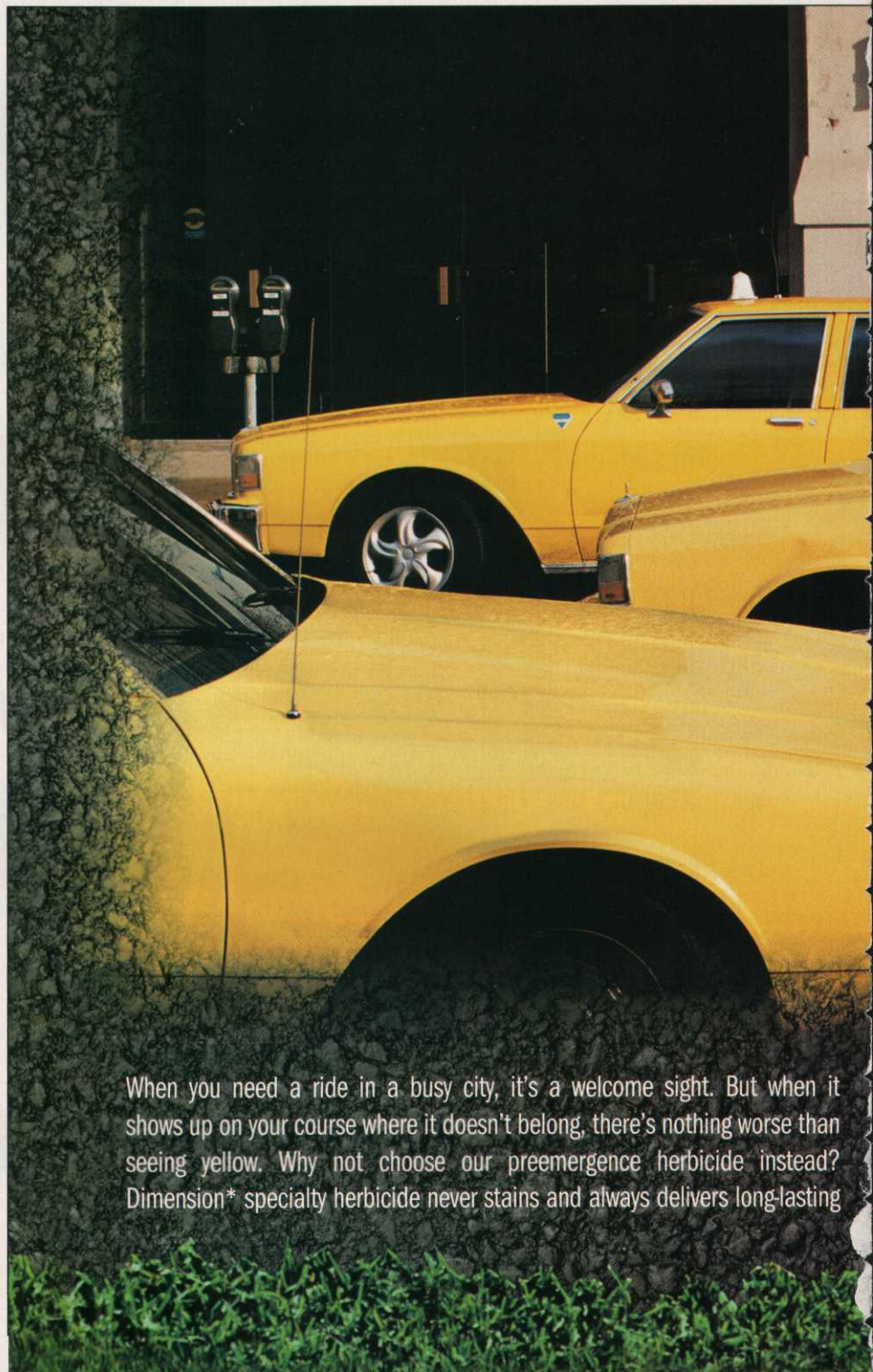
Some golfers grumbled about the golf car rule and play slowed a bit, Sharples says. But overall, most golfers understood why the rule was implemented.

To combat the drought and abide by the no-watering rule during the day, Sharples also made sure to water the course's drier areas more heavily at night. In addition, he turned some sprinkler heads off in the rough.

Some of the adjustments were a bit of a pain in the neck, Sharples admits. For instance, Sharples and other crew members had become well-adjusted to the ease of syringing greens by using a hand-held radio to command the course's automated irrigation system. But with the restriction in place, a few workers had to drag a hose around the course to syringe.

"It was more labor-intensive," Sharples says. "But we had to adjust."

While water restrictions are no fun, sometimes superintendents learn a few lessons from them. While Sharples admits syringing is a vital component of his irrigation program, he learned that maybe he doesn't need to syringe the course as much as he thought. "The course came



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