SeaIsle1 and SeaIsle2000 Keep Your Irrigation Options Open

Option A

Streams, Canals, Rivers, Ponds Lakes, Wells & Brackish Water

When irrigated with high quality water, SeaIsle 1 produces high quality fairways and roughs and SeaIsle 2000 produces top-quality greens. Both also thrive on many medium-to-poor-quality water sources. As with other grasses, Paspalum management will vary depending on water quality, rainfall and season.

Option B

Recycled Water, Gray Water and Effluent Water Sources

Recycled water quality varies by location, season and nutrient content. Depending on the uniformity of your source, you may need to monitor water quality daily, weekly or monthly. Both SeaIsle 1 and SeaIsle 2000 will do quite well with up to four, five and even eigth thousand TDS.

Option C

Even Blended OceanWater with Aggressive Management

Fresh water is a must during the grow-in phase for both SeaIsle varieties, but mature turf can be irrigated with ocean water/fresh water blends for short periods of time. This requires a comprehensive aeration and leaching program to move excess salts downward through the soil profile.

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Certified Seashore Paspalum
www.seaisle1.com

SeaIsle 2000
Certified Seashore Paspalum for Greens
www.seaisle2000.com

Continued from page 80

weeks while the new grass plants are still establishing themselves.

This overseeding program has worked very well for Miller at the various courses he has overseen. Any extra money spent on seed is more than made up by water savings, he says.

Most Southern courses could easily delay overseeding until Oct. 1 when the sun angle is lower, temperatures cooler and water requirements lower, Miller says. But they often overseed earlier to ensure perfect conditions when rounds begin to increase in October. Some facilities, especially in the Las Vegas area, begin overseeding as early as August to be in tournament condition for scheduled professional events, Miller notes.

"In the desert, they [use] so much water partly because they overseed earlier than they should," Miller says. Unfortunately, the hotter temperatures can also kill seedlings. That forces superintendents to occasionally buy more seed and repeat the overseeding process.

Any extra money spent on seed is more than made up by water savings.

An average Florida course with 100 acres of turf uses about 50 million gallons of water a year, Miller estimates. In Texas, it's probably close to 100 million gallons. In the desert the number is 200 to 250 million gallons per year. "Significant chunks of that water are used during overseeding," Miller says.

Other methods

Superintendents at other facilities also report seeking ways to reduce their water consumption during overseeding.

Paul Crawford, superintendent at Palm Beach (Fla.) Country Club for the past 25 years, notes that part of his course is at sea level and is normally fairly wet. "Overseeding actually helps me dry it out because I have an actively growing plant as opposed to the [dormant] bermudagrass," he says.

The club's reverse-osmosis water-treatment facility has lowered Crawford's water costs from $2.50 per 1,000 gallons for the city water he used to buy to just 27 cents per 1,000 gallons for the desalinated variety the treatment plant generates. Crawford will also install a new irrigation system next spring that will increase the number of sprinkler heads from 250 to 950. "With closer-spaced heads the water will not have to travel as far so you can isolate your watering more precisely," he says.

Crawford bases his irrigation regimen on years of observation and the use of moisture sensors. "There is nothing bet-

Continued on page 84

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Continued from page 82

ter than sticking a probe in the ground and checking the moisture content," he says. "I look at soil temperatures when determining when to overseed. As the temperatures drop, water consumption drops. If we get an early fall then we will be backing off on our water earlier."

Despite his enviable situation with a desalination plant and new irrigation system, Crawford keeps his perennial-ryegrass-overseeded fairways and bentgrass greens fairly thirsty.

"Irrigating less makes the plant go looking for water and develop deeper roots," he says. "If you give it too much water the roots will just stay right on top. Keeping it on the edge is sometimes scary, but is definitely the best method. Too much water is bad all over. It promotes disease and limits the root system."

Saving water during overseeding has not been a major issue for Mark Clark, certified superintendent of Troon Golf & Country Club in Scottsdale, Ariz. The private members demand pristine conditions from the time most begin arriving in October. The reclaimed water Clark uses at Troon is also in plentiful supply.

Clark pushed the beginning of overseeding back from the third week to the fourth week of September, which may save some water because of the slightly cooler temperatures in the foothills outside Phoenix later in the month. Courses in the valley must wait until mid-October to overseed because of the hotter temperatures.

Clark estimates he uses 15 percent of his annual irrigation water supply over the two weeks following seed spreading, putting down 700,000 gallons per day on the new seedlings during the first week and 400,000 gallons daily during the second. "I don't know how we could save water getting seed up, unless we did not overseed some areas, like roughs, or not overseed at all," he says.

In fact, some Arizona courses have done just that, Clark says. A few Phoenix courses have taken turf out of play and replaced it with desert vegetation in the past few years to reduce water use. Others have elected not to overseed roughs. A few courses did not overseed at all last year, including those belonging to the city of Phoenix, because of watering restrictions.

"Some of those restrictions have been lifted because we had 15 inches of rain over the winter, which is very unusual for us," Clark says. "The bermudagrass usually tans out around Thanksgiving and starts greening up in late February, so you are only looking at eight or nine weeks where it is not real green. But you are putting $200,000 into water, mowing, fertilizer, seed and all that to cover those nine weeks." ■

Peter Blais is a freelance writer from Monmouth, Maine.

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Building a *Better* Green

BY SARAH WILLNERD

USGA's changes to **'Recommendations for a Method of Putting Green Construction'** make agronomic, economic sense

With all of the different construction products and techniques that have come to the forefront in the past few years, superintendents are faced with myriad choices when constructing greens. In turn, they often look to the United States Golf Association (USGA) for clear guidance on how to construct a quality green.

"When you're writing guidelines being used as specifications, you can't go with something you think works some of the time, but you know doesn't work some of the time," says Jim Moore, the USGA's director of construction education. "You stick very strongly by what you're sure works."

In its ongoing efforts to assist superintendents in determining the best products for their courses, the USGA in 1993 and 2004 made its most significant changes to its "Recommendations for a Method of Putting Green Construction" by broadening categories that define what and how materials can be used to construct greens. The changes were made to accommodate the fast-evolving technology in course materials and construction methods and to address issues relating to testing on certain construction materials and methods.

The USGA, while acknowledging that all greens are different and that one solution does not fit all, says it will seek to eliminate the "un-

Continued on page 88

The expansion of the 2-year-old Whisper Rock Golf Club in Scottsdale, Ariz., which was constructed with inorganic amendments, revealed healthy, 8-inch to 10-inch bentgrass roots. The inclusion of inorganics into the 2004 USGA recommendations was one of the changes that the USGA made to assist builders and architects construct and maintain healthy turf.

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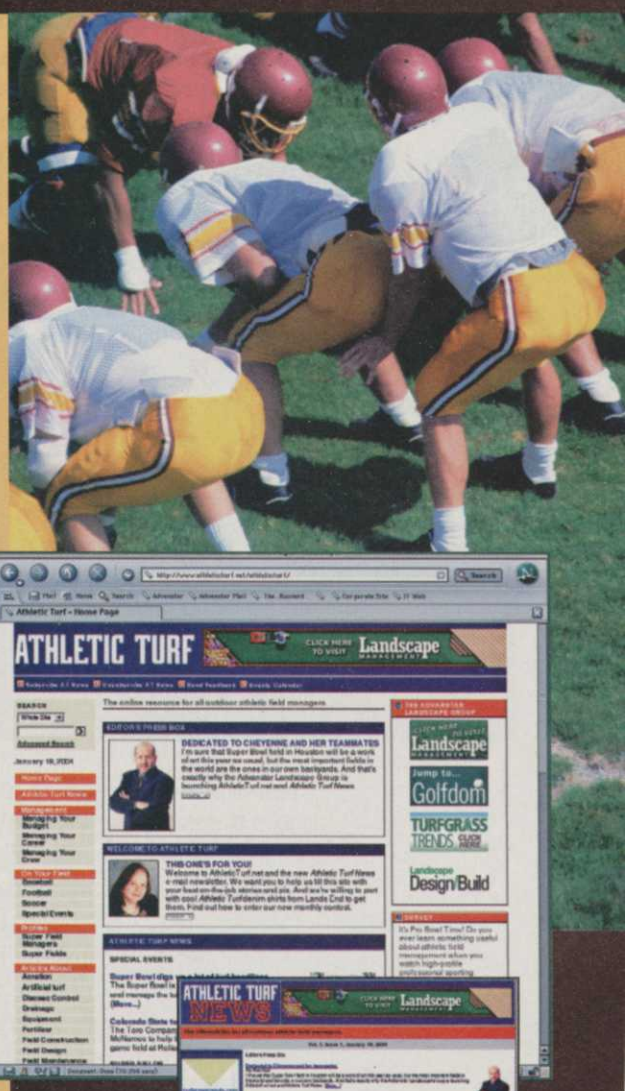

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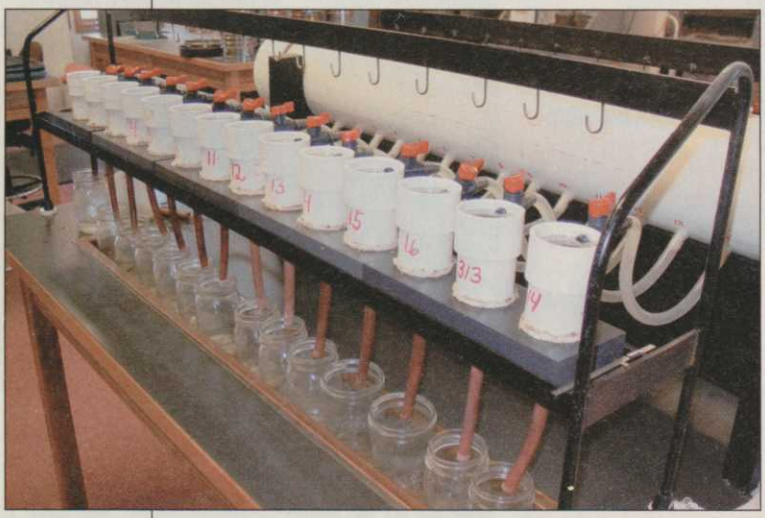
Continued from page 86

knowns" of green construction by continually testing new technologies and materials for quality and performance.

Industry standard

Initially created in 1960, the USGA recommendations have been the industry standard as well as the most widely used method of green construction throughout the United States and internationally. Prior to the 2004 amendment, the recommendations were revised in 1965, '73, '82, '89 and '93. The revisions were made to ensure that the success and performance of greens keep up with the many new challenges of green maintenance. Adding to these challenges has been the evolving technology that seeks to improve the quality of the soil and reduce the costs to construct greens.



A permeameter test is used to measure the infiltration rates of greens mixes.

With its emphasis on research, the USGA has funded more than $1 million of research on course constructions since the last recommendation changes in 1993. Seeking to evolve with the technological changes and to address superintendents' concerns on the undetermined performance of several new products on the market, the USGA made its first efforts to specifically broaden certain recommendations in 1993.

These changes to include new construction methods and materials were intended to make the process of building greens easier and more cost-effective and sought to provide greater flexibility in construction. The changes were all made with the caveat that the greens had to be properly tested and approved for USGA-standard quality and consistency.

One of the most significant changes occurred when the USGA altered the dynamics in course construction to mirror what more builders and architects were successfully using and to make new course constructions more cost effective. The change was to include the option to omit the intermediate or "choker" layer. Moore says this was the biggest change the USGA had ever made to its guidelines.

"(The intermediate layer) is very difficult and expensive to put in, and prior to 1993 the USGA insisted it be in the greens," Moore adds. Some greens were built without the layer and performed fine, he adds. Some greens were built without the choker layer and failed — their rootzone mixtures moved down into their gravel layers.

"But now, when people choose to build greens to USGA guidelines, they have the option of including the layer or leaving it out, depending on the makeup of their construction materials," Moore says. "Prior to 1993, we would tell you that you did not have a USGA green if you didn't have that layer in there."

The 2004 changes

By 2003 enough empirical evidence and research had come forth to mandate the recommendations be changed again. With 18 possible revisions, the USGA organized and sent the revisions through more than 200 people, including architects, agronomists, engineers and trade professionals, and several committees before determining six revisions were necessary.

These revisions included simplifying saturated hydraulic conductivity, widening the tolerance of the rootzone depth, widening the specifications for gravel size, increasing the coefficient of uniformity for gravel, allowing for the use of flat pipe with certain specifications, and allowing for the use of inorganic amendments in green construction, pending approval of the final rootzone mixture by the physical soil testing laboratory.

The inclusion of inorganics to the 2004 recommendations is one example of the USGA's efforts to broaden definitions of the

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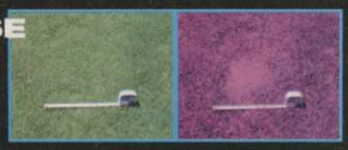

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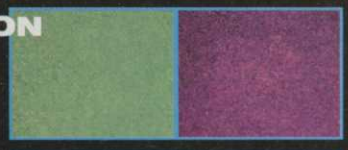

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The inclusion of inorganics in 2004 is one example of the USGA's efforts to broaden its recommendation definitions.

Continued from page 88

materials used to construct a USGA-quality green while addressing concerns about the performance of products whose performance tests have been determined to be inconclusive.

Specifically excluded prior to 2004, porous inorganic amendments such as calcined clays (porous ceramics), calcined diatomites and zeolites were added to the 2004 recommendations. While those changes do allow for the use of inorganics in the greens mix as long as they meet the particle size and performance criteria of the mix, the recommendations also caution that users should be aware of the differences in products and that conclusive testing on the performance of the inorganics was not prevalent.

To be sure, some in the golf course construction industry believe a sand/peat rootzone mix is the best mix for green construction. However, field evidence of greens that have mixed in inorganics has shown to also work well.

The bottom line, however, is that superintendents are ultimately responsible for how their courses' greens perform.

"By far, the greatest variable in how greens perform is the turfgrass manager," Moore says. "That far outweighs the construction of the green. I've visited superintendents in some climates who seemed to be able to grow grass on concrete in full shade. I've visited others that have everything going for them, and they still have problems."

Testing is conducted on green constructions to determine if construction contains appropriate particle size.

Moore said climate, the method of how a green is constructed, the type of materials used in the construction and the varying managing ability of superintendents all have influences on how a green performs. Moore says that adding an inorganic to the mix doesn't necessarily mean it will perform better.

"If we build a golf course in full sun, with full air movement, no traffic, it's in Colorado where we don't get any real disease pressure and we build the green like the back of a turtle so we have great surface drainage — it's practically a given the green is going to perform well," Moore adds.

Recent side-by-side test results have also provided additional insight and guidance to the options that superintendents have today in constructing an agronomically sound rootzone.

In a recent Ohio State University study, the use of inorganic amendments was shown to significantly improve sand-based rootzones' nutrient retention and prevent soluble nutrients from leaching and polluting the environment. Such research has been invaluable in assisting superintendents to determine the best mix and techniques.

Of course, some superintendents will rely on tried-and-true experience to determine what materials and construction techniques will work best. Ed Seay, executive vice president and chief operating officer with Arnold Palmer Golf Courses, is a proponent of using an inorganic, porous ceramic in all Palmer courses. Seay recommends their use because in his experience they've provided superintendents with reliably positive results.

"Every spec we send out has porous inorganic amendments included," he says. "The grass grows better and more consistent and it gives a stable, solid rootzone."

Ideally, the best research for a superintendent and his or her golf course's performance will be detailed studies conducted on his or her course. Even with the broadening of the recommendations, many believe that much research still needs to be done to accommodate new technologies, alternative materials and cultural practices to achieve the best courses possible. ■

Sarah Willnerd is a writer with Swanson Russell Associates, a communications firm in Lincoln, Neb.