

Looking Back While Looking Forward

The use of robotic mowers is likely to increase in the coming years, helping to further improve productivity.

Looking back often provides an interesting perspective when discussing golf course playing conditions and sustainability. Take this excerpt for example:

"Better turf for better golf is the goal of all pest control programs (weeds, diseases, insects, and small animals), but the development of the most desirable types of turf for golf depends also upon skill in management. The characteristics of turf affecting the ball in play are highly important. Close cutting, maximum density, and firmness with resiliency are three terms most applicable to turf of tournament quality on all but the roughs."

This perspective on turf maintenance holds just as true today as when the [article](#) was published in the May 1947 issue of the USGA Green Section Record.

So, where have we been, where are we now and where are we going in the future with playing conditions and sustainability? Specifically, where has technology taken us and what does the future hold? Before bringing out a crystal ball it is best to take a quick look at where we came from by going back 70 years and beyond.

In golf's infant stage, turf conditions were primarily dictated by survival of the fittest. Over time, new technologies have helped to reduce damage from diseases, weeds, insects and other pests. As the game grew in popularity, so too did the desire to improve playing conditions. The paragraph referenced above is a good reflection of those desires. The same article goes on to address each of the three main playing areas:

"Turf on tees should be firm to give confidence in the stance and be resilient to permit ready insertion of the peg tee. Generous fertilization, improved soil texture, and minimum irrigation consistent with good turf are guides to better turf on teeing grounds."

"Turf on fairways should be firm to provide a 'short roll' for the ball, resilient to facilitate walking, and of maximum density to hold the ball up so that it does not sink down into the grass. The worst enemy of good shots on the fairway is deep, soft, lush, overwatered turf. A small divot usually indicates better playing conditions than a large divot."

"Putting surfaces should be firm to avoid footprinting and should be resilient so that a properly played shot will hold, but should be sufficiently solid so that a poorly played shot will roll over. The surface should be smooth and true as a billiard table. Density of the turf should be so great that individual grass blades are crowded to a true vertical position. 'Graininess,' 'sponge' or 'mat' destroy accuracy and the fun in golf. Governing factors include: choice of grass, soil texture, drainage and aeration, fertility level, and watering practices."

During the past 70 years, many technological advances and maintenance trends have improved playing conditions. However, a new challenge has been introduced, embodied in the word sustainability. Concerns regarding resource consumption and the environment have led to the introduction of new technologies during the past several decades. These new technologies are having a truly positive impact on playing conditions and environmental and economic sustainability. A small, and in no way complete, list of key innovations and maintenance trends includes the following:

1960s – USGA putting green construction method, triplex mowers for putting greens, improved grasses

1970s – Automated irrigation systems

1980s – Spikeless golf shoes, upgrades to aeration and irrigation equipment, improved grasses, two-way radio communication

1990s – Fairway topdressing, the internet and personal computers, bunker liners, growth regulators, equipment wash areas, individual irrigation head control, cell phone communication

2000s – Oscillating fans, large-scale tree removal projects, spin topdressers, improved warm-season grasses

2010s – Moisture meters, GPS-guided sprayers, robotic mowers, drones, forward tee additions and wireless irrigation

The Future – An improved ability to identify weeds and spot spray, more forward tees, new grasses that use less water and offer greater pest resistance, expansion of robotic mowing to larger areas, advances in task tracking to improve management, advances in course mapping and increased use of soil moisture sensors are all likely advancements. Data-driven decision models will also play an increasingly important role in course maintenance. Examples include the use of growing-degree-day models for applying plant growth regulators, *Poa annua* seedhead suppression models and dollar spot control models.

The desire for quality playing conditions has remained unchanged, and it is not expected to change in the future. However, new technology will help deliver the conditions we desire with less water, less labor and improved environmental and economic sustainability. Technology has always been a key component in advancing the game, and those that are technologically savvy are expected to carry the torch forward. Unfortunately, none of these advancements address the fundamental difficulty of making every 3-foot putt.