

Irrigation Redesign to Conserve Water

Course No. 2 at the Pinehurst Resort
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The Problem

Pinehurst No.2, many felt, had lost much of the original characteristics that made it one of the classical, early to mid-1900s Donald Ross designs. The golf course had evolved to be too much like countless other courses in the post WWII era. The addition of turf and expanded irrigation eliminated many unique characteristics and strategic elements of the course.

Water was the common denominator. Essentially all of the changes Pinehurst No. 2 experienced in the past 60 years were associated with increased water use. Over time, as turf conditions improved and decisions were made to expand irrigation coverage, the original characteristics of the course became concealed or disguised by turf.

The Solution

The solution was to begin removing or eliminating turf and irrigation. Bill Coore and Ben Crenshaw were retained to evaluate how the golf course had evolved and restore its original character and strategic elements like expansive fairways and natural roughs. The restoration focused on reestablishing conditions similar to those between the 1936 PGA Championship until Donald Ross's death in 1948.

There were two significant revelations very early in the reconstruction process. The first was the realization that, based on old irrigation notes and drawings, much of the original center-row irrigation mainline pipes still were in place. The original mainline irrigation pipes were used as a guide to determine original fairway widths and contours.

The second revelation was an engineered, government, aerial photograph taken in December 1943 that gave us great confidence in proceeding with Coore and Crenshaw intuitions as we reestablished the turf footprint. The restoration reduced irrigation coverage from 1,150 sprinkler heads to 450 sprinkler heads. Most of the remaining sprinkler heads are associated with primary playing surfaces like greens, surrounds and tees. Fewer than 100 sprinkler heads are used to irrigate fairways.

Also, between 35 and 40 acres of turf were removed and replaced with native sand areas. Native wiregrass was established in the sand areas and over 40 native plant species, identified by Dr. Danesha Carly at North Carolina State University, have naturally reestablished to complete the restoration.

The Results

The elimination of turf and irrigation coverage has reduced annual water consumption by as much as 60 percent. It is important to note that only surface water from on-site lakes is used for irrigation. The original goal of the project wasn't necessarily to reduce water use but it was a wonderful byproduct of the restoration.

Now, the maintenance staff is able to focus the majority of our resources on a much smaller turf footprint. Resources are concentrated down the strategic center of the fairways. As a result, the turf in the center of the fairway exhibits more density and resiliency with a declining predictability the further one strays from the center; as it should.

Golfers have embraced the changes – especially the fairways that now are as much as 40 percent wider after the restoration. The native roughs with sand and hardpan are easier for many to advance shots from than the previous deep bermudagrass rough.

We had several challenges managing stormwater and erosion in areas where turf was removed. We made a decision early on to not disturb the topsoil in areas where turf was removed to avoid intensifying the problem. Once the newly established native areas experienced initial storms they settled into what we have today. We simply quit trying to

make sand stay in areas it didn't want to be – the result is a very natural, manageable and sustainable landscape.

We also continue to manage the native plants that have emerged in sandy rough areas. The course is very seasonal in the sense that the native plants emerge and mature at different times during the season. Many golfers are intrigued with the fact that the roughs are a little different each time they play the course.



Figure 1 - Reverting to a center-row irrigation system and removing turf contributed to an annual water use reduction of approximately 60 percent.