The Impact of Golf Courses on Soil Quality

Steven J. Thein
Kansas State University

Objectives:

1. Study the construction of a golf course in a grassland ecosystem.
2. Quantify indicators of soil quality and follow their change during the construction and establishment of a golf course on a natural grassland site.
3. Changes to soil quality indicators will be described, quantified, and used to predict areas where future golf construction and/or management actions may require special attention to minimize their negative environmental impact.

Start Date: 1998
Project Duration: 5 years
Total Funding: $50,000

Golf courses are only as sustainable as their weakest component which is often soil quality. The inherent sustainability of managed areas can be viewed as inversely propostional to the level of management needed to maintain it. Golf courses that diverge the most from their natural surroundings require the highest levels of most managaement inputs to be sustainable.

The extent that siting, constructing, developing, and using a golf course influences soil properties will ultimately determine both the inherent sustainability of a course and the level of management necessary for day-to-day operations. Currently, little or no information is available that tracks soil quality changes during the life of a golf course.

This project is monitoring soil quality criteria necessary to assess the long-term impact and sustainability of golf courses on the soil environment. Research was initiated in 1997-1998 when the future golf course site was in a natural grassland, or pre-construction condition.

These field observations and sample collections were made to establish base-line values for a host of critical indicators of soil quality. Mapping of the area identified seven soil series on the golf course site.

During late 1998 and for most of 1999, the course was in the "construction phase." Extensive modification of the original soil occurred in all fairways. Essentially a new and different soil profile was produced. A base layer typically consisting of unweathered or slightly-weathered shale and fractured limestone was put in place to shape each fairway according to architects specifications.

At Kansas State University, Dr. Steve Thein will monitor soil quality characteristics of undisturbed prairie and disturbed soils on the golf course fairways.

In some areas, the base layer consisted of subsoil materials quite high in silt and clay content. After topsoil was put in place and before the fairways were sodded, another set of samples was collected. Sodding finished in late 1999, and the course opened for play in May, 2000.

During the next several years the same sites will be sampled each spring and fall. Our objective is to quantify indicators of soil quality and follow their change during the construction and establishment of a golf course on a natural grassland site. Changes in soil quality indicators will be described, quantified, and used to predict areas where future golf construction and/or management require special attention. Plans are underway to computerize special imaging to assist in the evaluation of quality indicators.

Summary Points

- Researchers have collected samples and established base-line valuses for a host of critical indicators of soil quality from Colbert Hills golf course in Manhattan, KS.
- Mapping of the area identified seven soil series on the golf course.
- Changes in soil quality indicators will be described, quantified and used to assist future golf course construction.
- Computer imaging software is being used to track changes in soil quality indicators.