Integrated management guide for golf greens

Document prepared by Nancy Morin, Agronomist, M.A. Turf Science and based upon « Helping your greens make the grade » from James Francis Moore, USGA Director

This guide helps to evaluate the quality of golf greens in relation with environmental, edaphie, architectural factors. The quality of a green does flot rely on a single factor, but on a combination of several. The course superintendent can have complete or partial control over some of these factors, but absolutely none over some others. The first thing to do is to identify each factor that can affect the quality of a green and to evaluate its degree of impact. Then, we must change some of these factors so they affect the quality of golf greens in a positive way. Let's be honest: it is impossible to bring each factor to the optimal level of performance (A). For instance, a green built many years ago or not built according to USGA standards can only be classified into the lower class (D). Through an aggressive aeration program, class C is a feasible target, but only the reconstruction of a green can lead to class A. However, it is easier to upgrade the rating of some other factors, such as the entry and exit points of a golf green.

Step 1

Overall evaluation

First, evaluate the overall quality of greens using the following scale:

A. Premium quality
B. Goodquality
C. Average quality
D. Bad quality
E. Poor quality

Note : It is important that the evaluation be based over more than one season.

Use the quick-reference chart at the end of the Guide to register the ratings.

Step 2

Check every green, evaluate the impact of every factor listed below and fill in the report by identifying the improvements required.

For every green, the impact of every factor listed below must be evaluated. It takes about three hours to go through an 18-hole golf course.

Factors affecting the quality of golf greens:

- Daylight exposure
- Air circulation
- Entry and exit points of the green
- Size ofthe green
- Area available for pin placement
- Surface drainage
- Internal drainage and porosity of the root zone
- Irrigation : control and coverage
- Purity of grass species
- Number of rounds played
- Water quality
- Other factors (type of equipment used, mowing height, etc.)

Daylight exposure

Daylight exposure is a prerequisite for photosynthesis. Photosynthesis is the process by which plants harness solar energy and make it available for their growth.

To enhance daylight exposure, we must trim or even cut trees that are too close to greens thus preventing Sun rays to go through. Remember that trees grow and gel bigger season after season, which decreases even more the amount of daylight exposure for the green. Keep this in mind whenever someone telis you "We neyer had problems with this green before".

A. The green is exposed to direct sunlight for 8 hours or more per day.
B. The green is exposed to direct sunlight for 6 to 8 hours per day.
C. The green is exposed to direct sunlight for 4 to 6 hours per day.
D. The green is exposed to direct sunlight for 2 to 4 hours per day.
E. The green is exposed to direct sunlight for less than 2 hours per day.

Air circulation

Air circulation at the surface of the green is a factor too often neglected. Nevertheless, it affects directly the health of plants, particularly in relation with disease tolerance. The most harmful pathogens are less active and less destructive when air circulation at the surface of the green is efficient. Air circulation plays a major role when the surface of the green is dry. Wet surfaces favor the propagation of fungus diseases.

Air circulation can be enhanced by trimming or cutting trees. If for architectural or sentimental reasons trees cannot be cut, a structured trimming program must be established. Watch closely for mounds on the aprons as they can block air circulation, in which case they should be leveled. During periods of severe heat and moisture, fans could be required.

A. Air circulation at the surface ofthe green is absolutelyfree.
B. Prevailing winds are blocked but the other sides ofthe green are open.
C. Air circulation is limited as many sides ofthe green are obstructed.
D. Only one side ofthe green is open.
E. The green is located in a swale or in an area where there is virtually no air circulation.

Entry and exit points of the green

If entry and exit points are limited, the quality of the green can only be bad (lack of density). Mounds and bunkers reduce entry and exit points when they are too close to the green. Redesigning cart paths in order to change entry and exit points can be a solution. Ropes and signs can also be used, but make sure to move them on a regular basis. Sometimes, the fringe of the green must be redesigned to make il more accessible. Mounds can be lowered thus allowing golfers to step on them instead of having to move around them. Most golfers have no idea how important it is to vary their access to greens. Therefore, we need to promote their awareness on such a vital issue.

A. There are at least 4 entry and exit points on the green.
B. There are 3 entry and exit points on the green.
C. There are 2 entry and exit points on the green. To make golfers use other access points, ropes and signs must be used.
D. There is one entry and exit point on the green. To make golfers use other access points, ropes and signs must be used.
E. There is one entry and exit point on the green, and no other access is possible.

Size of the green

The popularity ofgolfkeeps on increasing year after year and the number of rounds played annually is of course on an upward siope also. The problem is that most golf courses have not been built to support such a heavy traffic.

A. The surface area of the green is over 7 000 sq. fi.
B. The surface area of the green is between 6 000 and 7 000 sq. fi.
C. The surface area ofthe green is between 5 000 and 6 000 sq. fi.
D. The surface area ofthe green is between 4 000 and 5 000 sq. fi.
E. The surface area ofthe green is less than 4 000 sq. fi.

Area available for pin placement

The increased popularity of the game must also be taken into consideration in relation with pin placement. Technically, no rule of golf applies to the distance that should separate the cup from the fringe of the green. Generally, the hole is located about 5 steps from the fringe and surrounded by a 3-feet fiat surface.

A. The area available for pin placement represents more than 50% ofthe green surface.
B. The area available for pin placement represents between 40 and 50% 0f the green surface.
C. The area available for pin placement represents between 30 and 40% ofthe green surface.
D. The area available for pin placement represents between 20 and 30% ofthe green surface.
E. The area available for pin placement represents less than 20% of the green surface.

Surface drainage

Surface drainage is very important. Even if the green is built according to standards, drainage becomes less efficient over the years. When surface drainage is inadequate, water accumulates in low-lying areas, where the root zone becomes saturated with water and the resulting anaerobic conditions cause the weakening and even the death of the plant. This zone then becomes vulnerable to fungus disease, algae development and even the formation of a black layer.

A. Water does not accumulate and surface drainage expands in at least three directions.
B. Water does not accumulate and surface drainage expands in two directions.
C. Water does not accumulate and surface drainage expands in one direction only.
D. Water does flot accumulate but surface water circulates toward a swale on the green and toward an entry/exit point.
E. Water does accumulate on the green.

Intake rate and porosity of the root zone

Note : This evaluation requires a laboratory analysis for porosity and water intake rates.

The intake rate can also be established in thefield using the appropriate equipment.

Water intake rate and porosity of the root zone are often the only two factors taken into consideration when the rebuilding of a green is undergone. USGA provides specific standards for such factors. In most cases, a green is rebuilt for the sole purpose of meeting with such standards. Ail the other factors that may have caused the poor quality of the green are often flot considered: 110 wonder flot ail the objectives are flot achieved. Intake rate and porosity are very important, but cannot compensate for lack of daylight exposure, inadequate air circulation, etc.

The most efficient way to increase the water intake rate and the porosity level is to rebuild the green, in part or totally. However, verticutting combined with traditional aeration do enhance these physical soil properties.

A. The green meets USGA standards.
B. The green was not built according to USGA standards, but the hydraulic conductivity exceeds 6 inches per hour and the surface drainage is adequate.
C. The hydraulic conductivity exceeds 6 inches per hour, but there is no subsurface drainage.
D. The stratification process limits the rapid water circulation in the root zone (6 inches).
E. The hydraulic conductivity is less than 6 inches per hour.

Irrigation : control and coverage

Irrigation is also a factor to be taken into consideration.

A. Irrigation is achieved with adjustable and full-coverage rotating sprinklers. Each sprinkler head is individually controlled by the automatic irrigation system.
B. The irrigation system does not con trol the perimeter coverage, but does control each individual sprinkler head.
C. The irrigation system neither controls the perimeter coverage not each individual sprinkler head, but it is specifically used for the green.
D. The irrigation system neither controls the perimeter coverage not each individual sprinkler head and it covers many greens at the same time.
E. The irrigation system of the green is manual.

Purity of grass species

Old greens ofien contain more than one grass species. For instance, bentgrass is often mixed with annual bluegrass. These two grass species have their own tolerance level to pathogens (insects and diseases) and their own reactions toward their environment (temperature, stress) or the cultural practices involved (mowing height). Management of grass species thus becomes more difficult.

A. The green contains more than 90% ofthe original grass species.
B. The green contains between 80 and 90% ofthe original grass species.
C. The green contains between 70 and 80% ofthe original grass species.
D. The green contains between 50 and 60% ofthe original grass species.
E. The green contains less than 50% of the original grass species.

Number of rounds played

Facts are clear: the less we walk on greens, the better they perform. However, several management techniques can enhance the plant tolerance to heavy traffie: proper seeds, appropriate mowing height, fertilization, aeration, etc. The total number of rounds played is mostly used for comparison purposes between various golf courses built according to similar standards.

A. The green sustains less than 20 000 people a year.
B. The green sustains less than 30 000 people a year.
C. The green sustains less than 40 000 people a year.
D. The green sustains less than 50 000 people a year.
E. The green sustains more than 50 000 people a year.

Water quality

Water used for irrigation purposes on golf greens can make the difference between a good and a bad quality green. If the quality of irrigation water seems doubtful, you should proceed with an appropriate analysis.

Note : This evaluation requires a laboratory analysis.

A. Water quality is excellent.
B. Water quality is good.
C. Water quality isfair.
D. Water quality is bad.
E. Water quality is poor.

Other factors to be taken into consideration...

Type of equipment made available to the superintendent (for instance, walk-behind mowers versus power mowers).

Mowing height.

Type and number of spiking practices, etc.