
Do You Have Green Creep?

Adapted and updated from:

By Ronald W. Fream

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Golf courses experience evolution, alteration, modification, maturation and aging, as all other living things do. Having now the benefit of over 35 years as a golf architect with exposure to golf in over 60 countries, and after observing some courses for 25 years or longer, it is easy for me to notice the incremental, and at times, profound changes that time induces.

These alterations are natural and evolutionary. Golf course maintenance crews induce and enhance some of the changes. Equipment technology advances have accelerated and forced change. Plant physiology, human genetics, nutrition, television and golf publications have expedited the demand or need for adaptation to change or counteractions. These step-by-step modifications are naturally occurring as distinguished from greens committee action or periodic remodeling for the sake of design renewal.

GREEN CREEP

Green creep is my original catchall phrase describing the inevitable alterations, which emerge, on every course. The rate of emergence, the frequency and the extent are variable in response to the type of course, location, climate, turfgrass varieties, soil conditions, original design and construction methods, intensity and quality of maintenance, volume of play and financial strength of the golf course owner. Alterations tend to occur faster with tropical climate grasses than with cool season, or northern climate, grasses. Year-round growth expedites the changes. Changes will be more abrupt and occur quite rapidly when maintenance standards are marginal.

Green creep emerges as maintenance commences on a new course. However, it increases in prominence the

older the course is. Green creep is cumulative and is part of the aging process of every course. There exists no easy way to avoid some component of green creep. That green creep is so prevalent and yet so unnoticed is due to the almost glacial rate of occurrence of many actions.

At its most basic, green creep is altered shapes and sizes of putting surfaces, the repositioning of bunker edges, changes in bunker shape or size, altered shapes and sizes of teeing area surfaces, and narrowing of fairways due to insidious, little-by-little, mowing changes and sand edging practices. These changes can become several too many feet of distance over time.

By not killing the grass, maintenance personnel keep their jobs. As the person mowing the putting surfaces does that job, each day a little uncut collar is left to prevent scalping. The person mowing tends to cut inside yesterday's cut. Concurrently, straighter lines or more rounded lines of cut emerge over time. The putting green surface becomes smaller in overall surface and rounder or oval,

more uniform and less visually appealing in shape. Flagstick placement area will be reduced.

BUNKER CREEP

Often, bunker edging does not cut back all of the growth that has occurred since the bunker edge was last trimmed. The person doing the edging often overlooks the original outline shape. The grass remaining has grown more on to the sand than before. Continued edging over time tends to cut off designed undulations or irregular outlined shapes. The sand surface area becomes less. The presence of the sand is less obvious to the oncoming golfer. What were visible sand surfaces from the tee is now grass. What had been a visible bunker in the fairway is now a barely noticeable sand depression or appears from the players' view to be only grass. Inattentive edging turns many bunkers into boring oval shapes.

The aesthetic and strategic reason for the bunker has been greatly reduced or completely lost. Now, the sand is blind to



Over time, the effects of green creep can result in smaller, rounder putting surfaces that are less visually appealing.

the player and, therefore, has become an unfair hazard. What was visually a nicely outlined bunker, now, 10 years on, is another round saucer-like bunker or a square or rectangular one.

Excessive adding of sand over time tends to flatten and make shallower what originally was a meaningful sand hazard. Siltation can clog the drainage system and the bunker is a pond when it rains. In some environments, the action of blowing wind can cause sand to accumulate at one prevailing edge or side of the bunker. Sand accumulates and the grass continues to grow. Now that portion is substantially higher than before. Sand visibility has been reduced. This also occurs from the use of mechanized sand trap raking machines that enter and depart a bunker at the same point repeatedly. The shifting growth of bunker edges will greatly alter the appearance of a bunker over time. The aesthetic beauty is lost, as is the intended strategic value of the once visible, obvious hazard.

As the green surfaces become smaller and rounder, day-by-day and year-by-year, in response to mowing practices the area for flagstick placement is reduced. Bunker creep also changes the horizontal spatial distance relationship between flagstick position and green edge to adjacent sand bunker. Green surface and sand bunkers move farther apart. Topdressing of greens, as a normal process of maintenance, will smooth out a green surface, and often removes original contouring creating a flatter, less contoured putting surface overtime.

Progressively smaller greens, greater distances between flagstick and bunker sand and less before the shot visual awareness of bunker locations contribute to substantially different playing conditions than the original design possessed. Flagstick placement options are reduced. Smaller and rounder putting surface shapes alter the originally designed-in approach play strategic factors, lessening the challenge and diversity. After 10 or 15 years, reductions of 25 percent or more in pinable green surface are common.

Smaller putting surfaces reduce pin placement options. The original design diversity in flagstick placement variation has become lost. Smaller putting surfaces concentrate golfer traffic and pitch marks, increase seedbed compaction, and encourage turf wear-and-tear. This reduction in usable area leads to deteriorating putting



Before Reconstruction: Green creep makes courses more homogeneous, more similar in visual and playing appearance and certainly decreases the playing challenge of the original design.



After Reconstruction: If carefully planned and executed, the results of a modernization and restoration program can produce an aesthetically pleasing and more challenging course that increases rounds and return visits.

surfaces, soggy surfaces, missed putts and increased maintenance costs. Often, a concurrent action is the natural conversion of the original putting surface turf into a mélange of diverse species and even weeds. Poa annua invades. The hybrid Bermuda surface thins as compaction increases.

TEES ARE NOT EXEMPT

Similarly, slow motion changes occur on teeing surfaces. Day-by-day mowing can change the shape, reduce the usable surface, increase wear-and-tear, and alter the outline edge and adversely impact play. Smaller teeing surface area is a result. Less surface area reduces the opportunity to rest part of the tee to encourage regrowth. Smaller surfaces will reduce the variety of play options a larger tee area can provide.

Incorrect and inattentive divot repair and inadequate total tee surface topdressing will turn a flat, uniform, comfortable surface into one crowned, bumpy, or with the surfaces sloping in several directions. Traffic-induced seedbed compaction problems increase drainage problems. Turf quality deteriorates. Any of these creeping changes can alter how the player addresses the ball. More miss-hit shots result. Visual appearance deteriorates.

Inattentive mowing leads to tee surface alignments not focused on the center of the fairway or par 3 greensite. The person setting the tee blocks might not orient the markers correctly, perpendicular to the desired line of play. Inattentive golfers will line up their shot on this inaccurate orientation thereby hitting incorrect shots, wasting time, and raising scores. Miss-hit shots thus result at no fault of the golfer. Some of those miss-hit shots might fly into



Soon after opening day, green creep begins to emerge, even if slowly, as maintenance commences on a new course. This new course will eventually experience evolutionary changes.

adjacent properties.

Changes such as these are incremental and slow. Ten to 15 years after opening is a good time to begin noticing the difference. However, some green and bunker shape changes can often be noted by year 5.

When visiting older courses, the extent of change can be remarkable if you are looking for them. These alterations are so glacial that to the Green Committee, general manager, golf pro or superintendent, the differences might not even be apparent. The players hardly notice, unless turf deterioration becomes obvious. Many players will never even think of what might have been or what was years ago. They play in the here and now. Property damage or personal injury can result.

THE ORIGINAL DESIGN HAS BEEN LOST

A new superintendent, a new pro or general manager taking over 10 or 20 years after opening, or a first time player, seldom will even be aware of what might have been the original design intent. The golf architect's name may have been lost. The original design drawings often have been lost or discarded.

Unfortunately, these creeping changes tend to soften the course and will remove much of the original playing strat-

egy. This turns what might have been a visually interesting and exciting design into a round, common and boring one. The fame or talent of the original architect does nothing to prevent these changes. U.S.G.A. greens seedbed mixtures do not prevent green creep or bunker creep. A certified superintendent is not immune. The course can be greatly different from that on opening day long ago without an awareness of green creep.

FAIRWAY CHANGES

The creeping effects of time also manifest themselves within fairways. Continued golfer traffic and ongoing maintenance contribute greatly to soil compaction. Few courses are aerated often enough due to frequent golfer objections. Increasing volumes of traffic and/or insufficient aeration efforts to counter the traffic yields even more compacted soils.

Compaction is the main cancer of a golf course. Over time, creeping compaction accumulates sufficiently to induce more wet spots, poor drainage, weed invasions and the die out of the preferred grass variety. Compaction induces and expands wet areas. Once in place, only removal or repair by adding improved drainage will remove wet and muddy areas. Compaction reduces and eliminates oxygen within the seedbed. Drainage is impeded. Turf deterioration is the inevitable result.

Homogeneous stands of turf become patchy and irregular as weed or course grasses invade.

In many emerging golf countries, caddies remain a standard, one player, one caddie. Perhaps, in the hot season, an umbrella carrier also accompanies the player. Try 30,000 or 40,000 rounds of play, plus a similar number of caddies and umbrella carriers. Now, we see a total of approximately 100,000 pairs of feet trafficking over a course.

The greens committee, and even the golf superintendent, overlooks this accumulation of traffic. Compaction is a cancer that can envelope a course, green, tee or fairway as it increases in severity. Failing to aerate adequately to counter the onset or advance of compaction encourages green creep and general turf deterioration. This impact however is progressive and cumulative, not clearly obvious early on to those not attuned to the condition.

In tropical climates, maintenance practices can contribute to a creeping change of considerable proportion more rapidly than in cooler environments. Insufficient or infrequent fertilization and/or an absence or lack of sufficient micronutrients can produce a weakened primary turf that yields to the invasion of less desirable indigenous species. Hybrid Bermuda can be overtaken by cowgrass, savannah grass or other local native species when nutrient levels are not maintained at the level suitable for the hybrid Bermudagrass turf.

Insufficient fairway aeration to counter compaction can lead to turf deterioration and varietal differences too. Cowgrass prospers where Bermuda might not. *Poa annua* rapidly replaces creeping bentgrass or Kentucky bluegrass in compacted situations.

Replacing overgrown fairways in tropical climates with improved *Zoysia* or *Paspalum* varieties is an option. Renovation of distressed fairways by killing the *Poa annua* and reseeding with an improved variety is an option. Ongoing overseeding can help restore a more playable turf.

TREES ARE IMPORTANT

Tree growth creeps upon a course as well. Too often, golf superintendents budget little for annual tree care, particularly proper pruning or thinning. Players seldom notice

the annual growth of a tree, yet overplanting of new courses in originally open areas, and too gentle a tree clearing on wooded sites, leave more than ample tree growth overtime. Ongoing general thinning and reshaping of trees is frequently lacking so excessive growth results. Creeping tree expansion directly influences golf shots on the same hole differently overtime if not corrected. Fairways become narrower. The strategy of play around a particular specimen tree can be significantly altered. More shots are in the rough. The trees are thicker in the rough. Play is slowed. As the trees age, encroaching and increasing shade and surface roots will cause turf maintenance problems. Inadequate, sunlight thins most turf varieties. Root pruning might be as necessary as shade mitigation efforts and thinning.

Tree shade can be a very serious result of unrestrained growth. For healthy, dense turfgrass to prosper, the turf should receive some five to seven hours of direct sunlight per day. As the canopy of the trees creep outward, this sunlight requirement is lost and the turf quality inevitably thins and deteriorates. Weeds, thin open turf or bare ground result.

NOT SO "CREEPING" TECHNOLOGY

Two of the most profound changes that have crept rapidly in the past 10 years have been the explosion of new technology and enhanced physical well-being. An increasing number of senior players also are an evolutionary result.

Innovations in golf club heads, grips, new shaft materials, and significantly altered golf ball designs, have in effect shortened many courses.

Tiger Woods is not the only taller, leaner, more flexible golfer out there. Put better equipment in any player's hand and the ball will go farther, if not straighter.

Improved tee shot length has greatly affected play. Twenty-five years ago, fairway bunkers set in the 220 to 250 yard area had impact upon the better players and even the pros. No longer is this the case. Today, fairway bunkers 260 yards off the back tee do not intimidate the better players. Club players or the daily-fee golfer expects to drive 230 or 250 yards and that range is beyond many existing fairway bunkers. Women hitting farther can almost reach the fairway bunkers when

those bunkers were not originally positioned for that purpose.

Green creep and bunker creep shift targets and modify bunker positions. Bunker creep alone, when extensive, can move the sand basin 10, 20 or even 30 feet (3 to 10 meters) with time. Ten yards shorter or longer can incorrectly impact a shot. While smaller putting surfaces might, in some ways, compensate against longer tee shots, these size reductions are not design or play strategy driven. Therefore, the changes do not contribute to the benefit of the game.

Improved tee shot length impacts tee positions. Many courses do not have extra room available to add longer back tees. Lengthening a hole by 20 or 30 yards (6 to 10 meters) is occasionally impossible. Repositioning of middle and forward tees may be one partial remedy to counteract increased hitting lengths. However, this might concentrate play on too small a surface leading to compaction problems.

If space is available, increasing the number of teeing positions and playing lengths from only two or three to four or five is normally necessary to fully accommodate today's wider range of players, playing lengths and ages of players. Offering six distinct playing lengths is reasonable now. Growing volumes of play increase wear-and-tear requiring larger tee surfaces to counter that traffic. Increasing tee surface size can provide more playing diversity and ease tee top maintenance demands. However, many older courses do not have excess land available for hole lengthening.

An alert superintendent can regularly overcut the putting surface or tee edge apron by a few inches or centimeters. A yellowish discoloration will be visible for a few days. However, this repositioning of the putting or teeing surface can help retain the original outline shape and surface area. Sequential lowering of the mowing height in a larger area can lead to increased reclaimed putting or tee surface.

Fairway mowing patterns and fairway outline shapes have crept over time. New machinery can provide visually attractive patterns even if the width or outline shape of the fairway has changed over the years. Fairways frequently become narrower. Removing some trees and widening fairway areas can help expedite play. Reducing shading always aids turf growth.

Semi-rough and rough areas tend to creep inward as well, partially due to inadequate maintenance staff attention. Recontouring and expanding fairway and reducing maintained rough areas could compensate for increased tree growth and more senior players. Longer hitters often will benefit from expanded fairway widths since length and accuracy are not synonymous and speed of play is always a factor. Tightened, long landing areas challenge the big hitters and can be a good thing.

Broadening the depth and area of rough might have a place at some courses. However, increasing the area of semi-rough or maintained rough only toughens a course. In today's economy, most courses seek rapid play as an economic necessity. Deep and thick roughs are counterproductive. Introducing new contour mowing patterns can add eye appeal and even make flat fairways look better.

Bunker creep and technology have overtaken the irrigation system too. A new, more versatile and efficient pumping plant could be necessary. Upgrading the irrigation system control to a more modern computer operation might save labor, improve turf quality and conserve water and electricity. Being efficient in water use is becoming a necessity. Reduced pumping can lower electricity costs.

Reshaping of greensites or repositioning of fairway bunkers can require sprinkler head replacement, repositioning or the addition of heads for uniform coverage. Recent improvements in sprinkler head operation, water distribution and water efficiency should encourage sprinkler head replacement. Adapting to the use of sewage effluent irrigation water is becoming a necessity in some regions. Adding supplementary irrigation water storage lakes might be desirable and could be an aesthetic, strategic and environmental enhancement as well.

Green creep impacts water storage and ornamental lakes, ponds and streams. Water vegetation can expand in volume filling the lake. Grass from the edges can grow into the water reducing surface area. Bentgrass can easily form a blanket on a pond surface. Excessive algae growth can clog a pond or lake over a few years with unrestrained growth. Uncontrolled lake edge waterweed growth can obscure ornamental walls. Irrigation storage capacity or flood control capacity

might be reduced. Giving attention to lake maintenance should be a priority, but usually is not.

Time and increasing golfer traffic adversely change soil structures. Dry fairways could evolve into small muddy spots. As rainfall, pedestrian, cart and maintenance traffic continue, the compacted, muddy and degraded areas can migrate; spreading like a cancer. Turf deterioration follows. Additional subsurface drainage or sand-capping fairways could be necessary to expand playing opportunities during wet weather.

Putting surfaces often become wet sponges or brick-hard when the seedbed has deteriorated due to compaction. Tee tops are one of the first areas to demonstrate the impact of compaction on turfgrass quality. Correcting compaction problems with the addition of sand capping can help. Select sand and correct subsurface drainage are critical to the effort. Ample aeration of seedbed surfaces is rare. Deep-tine aeration is a recent addition to the golf superintendent's maintenance arsenal.

Golf cart pathways or the extension of existing paths becomes necessary as the volume of play increases. Replacing fairway cart traffic onto cart paths combats fairway compaction and seedbed deterioration. Adding expanded "lay-by" cart parking positions can ease congestion near greens and tees. Curbing could control wayward drivers. Repositioning some cart paths might improve utilization and speed up play. Longer golf ball flight might bring some cart locations into target range. Relocation for safety's sake might be necessary. Converting from gravel or dirt to concrete or asphalt will improve maintenance and enhance the visual elements. Cart traffic always will cause compaction when not on a path.

Few old courses are today as they were when they first opened. Noted courses, such as Augusta National, Pine Valley and Pebble Beach, bear little resemblance to their early years of operation, even though current owners or members believe they are holders of the original design and product.

Some changes are committee induced, not green creep, however, and still result in substantial alteration from the original design. Green committee members do not always make the best decisions for golf course alteration. Too often, broad, long-term vision is exchanged for

the short term or personal gratification motivation.

Green creep makes courses more homogeneous in visual and playing appearance and decreases the playing challenge of the original design. Few professional golf architects of the last half of the 20th century would have designed every green to be round, every fairway flat and every bunker in the image of a peanut or saucer.

REMODELING AS A REMEDY

"When I am doing bunker and green creep corrections, I feel just like a plastic surgeon. I am doing nip and tuck, wrinkle removal, Botox injections, a little middle-age facelift and enhancement, a few hair grafts," Fream said. "Pouty lips on a bunker are preferable to thin ones. Greens with nice curving surfaces are preferred. Our work involves some liposuction, taking the excess accumulated fat out of a mature golf course and returning to a more youthful look."

Correcting green creep becomes a remodeling and modernization program, even if some effort is devoted to recapturing a long lost design glory. Modern volumes of play, enhanced expectations for turfgrass quality, a focus on visual dynamics and who has the toughest course will influence some remodeling efforts. Remodeling to a budget, to meet user market green fees or membership capability is certainly feasible.

Revitalizing an older course to join today's standards and meet expectations while accommodating more play is attainable and can occur in an affordable way. Corrections are to enhance play, not raise the price to play.

Often corrections can involve only mowing pattern changes or bunker edge re-cutting. A comprehensive master plan should guide more involved elaborate directives. The master plan for revising a hole or a course should be precise and comprehensive. Accurate working drawings should be utilized. Not only golf design, but also ornamental horticulture and turfgrass agronomics are part of the solution.

The corrective effort could occur over an extended period of time, be sequential, priority phased or occur quite quickly over an entire course. Bunker edge corrective changes could happen quickly and have a clearly obvious and

beneficial result. The existing maintenance crew or a small team of laborers can be directed to implement some green and bunker creep counteractions.

To do nothing, and continue with the status quo, is a continuing downward slide. From a competitive viewpoint, the slowly deteriorating course that does nothing in response certainly loses market share to newer courses in the area. Golfers are becoming more highly attuned to the visually dynamic style of golf. Countering years of evolutionary change will have a direct and positive economic benefit.

To see the problem, to understand there is a problem, is not for everyone to do. Being too close, being there too long, being too new to the situation and not being attuned to the action shields the viewer from the knowledge of what had been and what can be. An impartial, experienced eye brings great value.

Much of this article's focus is on easy to implement, relatively inexpensive actions to reclaim what once was there. This must not be confused with the more extensive makeover or upgrade and repositioning that can be very elaborate, involved, costly and very beneficial.

An assessment of existing playing conditions, the members' desires, analysis of current market competition, user demographics, operational goals, economics, agronomics, local competition and other factors become part of any renovation, restoration or modernization program.

The restoration or modernization program must be carefully planned and correctly implemented. The results can be spectacular; the cost of implementation need not be excessive.

Green creep is here to stay and we must deal with it, sooner or later.

Photos by: Ronald Fream

For information on renewing and remodeling courses, please contact:

GOLFPLAN
PO BOX 1823
SANTA ROSA, CA 95403 USA
WWW.GOLFPLAN.COM
GOLFPLAN@GOLFPLAN.COM

