

TURFGRASS TRENDS

GOLF AND THE ENVIRONMENT

The Making of Machrihanish Dunes

Architect, head greenkeeper jump environmental hurdles to help create a natural gem in Scotland

By Anthony Pioppi

Just inside the seaside dunes in this speck of a town on the Mull of Kintyre in southwestern Scotland, a golf course has come to life. To say it was "built" is somewhat misleading. It's more as if Machrihanish Dunes Golf Club was unfurled or, perhaps, revealed.

In all likelihood, never has the creation of a golf course ever been attempted on land that came with so many environmental restrictions, and quite possibly no other architect or grow-in superintendent has had to work under such taut constraints as David McLay Kidd and Euan Grant.

Machrihanish Dunes, which has a soft opening this month and opens officially on July 21, is the only course ever built inside a Site of Special Scientific Interest — commonly known as "Triple-SI" — the most restrictive classification of Scottish National Heritage (SNH). It's the organization that protects the flora, fauna and geology of the country, ensuring it can be enjoyed by the inhabitants and tourists. Of the roughly 275 acres on the site, construction of the course disturbed a miniscule seven, not 70, *seven*. Earth was only moved for creation of tees and greens. Fairway bunker placement was determined, not by the architect, but by grassless areas created naturally, in some instances, by the scratching of the native rabbits. The routing was, in essence, determined by SNH and thousands of years of wind and water.

Kidd says he submitted dozens of routings before the current one was accepted. Since that time literally hundreds of alterations have been made. The site, which was used to graze cattle for generations and abuts one of the world's great links courses in Machrihanish Golf Club, contains a plethora of Scottish rarities both geological and floral. Beginning just in from the Atlantic Ocean, the large fore dunes are rich in lime, which is unusual for the west of Scotland. The fore dunes meld into a plain that once ran eight or so miles across Kintyre to Campbeltown on the east coast of the peninsula. Back then, peat bogs would have been found on the site as well. Of what is left of the plain, there are five varieties of orchids and one gentian worthy of protection. The most rare are the Early Marsh orchid and Pyramid orchid found in the low, damp areas of the dunes known as dune slacks. The course was routed away from large patches of the plants so that even wayward shots will not end there.

Head Greenkeeper Euan Grant says he expected restraints in regard to turf

Continued on page 42

IN THIS ISSUE

■ **Know Your Carbon Footprint**
"Going green" is not only good from an ecological standpoint, it's good for business.....46

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In all likelihood, never has the creation of a golf course ever been attempted on land that came with so many environmental restrictions.



Continued from page 41
maintenance at Machrihanish Dunes. “But no way could I envision to what extent they would be,” he adds.

There is no artificial drainage anywhere on the course. Irrigation is only for greens and tees. Grant, who has done two grow-ins, can use no fertilizers, pesticides or plant growth regulators on areas other than greens and tees. No topdressing of fairways is allowed. Overseeding of fairways can only be done with grass varieties that fit the exact natural turf types on the property; so far Grant has found 21 kilos of acceptable seed, all produced in the surrounding area. Other than for the greens, no seed from outside sources will find its way onto the property.

As an example of how truly difficult the project is, Grant explains the construction of the greens. The first step was for the natural turf from each site to be removed with a sod cutter at a thickness that would allow it to be replanted. The thin slivers of grass invariably left by the process had to be saved and reused. The turfgrass was then replanted on site carefully, but not just anywhere.

The turfgrass taken from nearest the dunes had to be put back near the dunes in areas determined by SNH. Turfgrass removed near the mid-point of the course had to go back down in that section as well. Turfgrass was used to cover rabbit holes or other exposed areas.

Two of Grant’s greenkeepers were with him at St. Andrews. Keith Martin, who left the Old Course to work on courses in Hol-

land and Australia, returned to become the first assistant. The head mechanic is Haydn Chambers, who has taken on a variety of jobs besides turning wrenches during the grow-in, including building artificial nesting areas for wheatear, a protected bird species found on the property. There is also the rare skylark, which is globally threatened and nests in rabbit holes, including on the Machrihanish Dunes site.

A large reason SNH approved the project was the willingness of developer Brian Keating to work with SNH. Keating, an Australian entrepreneur who now lives in Glasgow with his three children, says he fell in love with the site after playing nine holes at the Machrihanish Golf Club, one of the world’s great links golf courses designed by Old Tom Morris. The fifth hole at Machrihanish Dunes touches the 16th at Machrihanish Golf Club. Keating says it was pouring down frigid rain when he walked off the course and immediately sought out the landowners of the adjacent property about selling. Since the land deal — a lease with option to buy — was signed with brothers Robin and James Barr, Keating keeps the Barrs updated on the progress and stops in to see them at least once a month.

Soon after the deal was signed, Keating hired a geomorphologist consultant to help prepare the proposal that would be submitted to SNH. Here Keating, the man who brought Apple Computer to Russia, showed his savvy. The consultant was the highly respected Jim Hansom, Ph.D., professor at

Continued on page 44



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Continued from page 42

Glasgow University and a member of the SNH board of directors. At least one SNH staff member studied under Hanson in grad school. Keating said his team worked quietly for six months before submitting the permit applications to SNH.

Keating's strategy worked, and SNH approved the plan after a series of revisions. Once the project was given a thumbs up, ecologist Carol Crawford was hired by Keating to oversee the project, coming on board in 2004. She was on site once a week during construction, which ran from June to December of 2007. Crawford was responsible for making sure construction took place within parameters of the permits while making judgments on changes that came up during work, often times rejecting proposed alterations. Grant says some of Crawford's changes were maddening, but he readily admits that "she was absolutely right" every time.

It was not just Grant who had to deal with the alterations made during the build. "I'd be happy to throw down the gauntlet to any of my peers and say, 'See if you'll go through this,'" Kidd says of the trials and tribulations.

There are also environmental concerns about the out-of-play areas. For decades, cattle grazed the land, allowing the rare species to thrive while keeping out the "rank grasses," says Stan Phillips of the Scottish National Heritage. Although cows have no place on a golf course, sheep are a different story. A herd of about 80 is on site until the opening of the course, and a few will be allowed to wander the grounds during the peak season. When play drops off in the fall, the entire herd will be brought back to graze until the spring, when the majority of golfers return.

"That's a massive benefit of the course and not at public expense," Phillips says.

Crawford says it's likely that large patches of the rare flowers that had been grazed by the cattle will now bloom for the first time in years.

SNH allowed the removal of tens of thousands of rabbits that were on site and responsible for much of the turf destruction.

Keating says he had no problem working within the environmental dictates and that



Sheep are a common sight. A few will be allowed to wander the grounds during the peak season.

it brings "a uniqueness" to the course. "The Way Golf Began," the motto for Machrihanish Dunes, was devised for marketing purposes, but Keating said it reflects the project accurately.

"That really is the essence of what we're doing," he says. "There's no other site available next to an Old Tom."

This site, like all the Old Toms, came to life with nature as the principal architect, and it will be nature that continues to alter it.

Kidd says he is happy with how the course has turned out and is looking forward to what the future — thanks to the wind, sheep and few remaining rabbits — will display to golfers.

"I hope they love it for what it is now," Kidd says. "And the passage of time will improve it."

Pioppi, a contributing editor to Golfdom, traveled to Machrihanish Dunes during its construction for this story.

PHOTO BY: ANTHONY PLOPPI

TURFGRASS TRENDS

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Know Your Carbon Footprint

“Going green” is not only good from an ecological standpoint, it’s good for business

By John Jonasson

In these difficult times, many golf courses are “going green” to attract new golfers and, in doing so, are reducing their operating costs. This new philosophy pays off: “Going green” makes good cents.

In addition to economic pressures, environmental pressures continue to mount. While the golf industry has improved its environmental performance so people understand and appreciate the benefits golf courses provide, government agencies and many environmental and political groups either do not understand the benefits or discount them because of philosophical beliefs. Environmental pressures continue to grow, including a spotlight on pesticide use and management, fertilizer use and management, water use for irrigation, habitat endangerment, community health, groundwater and surface-water contamination, air pollution and even complaints about increased traffic/noise.

A key component of “going green” is to address your operation’s greenhouse (GHG) gas emissions and to reduce its carbon footprint. With current environmental trends, no golf course will be exempt from pressures related to climate change. Government, at all levels, contemplates enacting climate change/greenhouse gas legislation. Some organizations, including golf courses, may be required to quantify, report and reduce their greenhouse emissions.

Defining greenhouse gases

Gases that trap heat in the atmosphere are referred to as greenhouse gases (GHG). GHG either occur naturally or are emitted to the atmosphere through natural processes and human activities. Some GHGs are created and emitted solely through human activities and are under our control. The principal GHGs resulting from human activity are:

- **Carbon dioxide**, which enters the atmosphere through the burning of fossil fuels (oil, natural gas, propane, coal, etc.), solid waste, trees and other wood/organic products, and

also of other chemical reactions. It can be removed from the atmosphere (sequestered) when it is absorbed by plants (trees, turfgrass) as part of the biological cycle.

- **Methane**, emitted during production and transport of coal, natural gas and oil. Methane is also produced from agricultural practices (including turf management) and by the decay of organic waste in municipal solid waste landfills.

- **Nitrous oxide emissions**, which depend on soil conditions, fertilizer application rates and meteorological conditions.

To be prepared for climate-change pressures, and to enhance the social responsibility principles of your golf course, consider initiating a GHG environmental assessment/action plan. It can pay off well.

Golf course examples

Two courses make a good example of the savings possible. The first, an 18-hole public course in western Canada, is open all year. Its GHG emissions and reduction targets for each input area are: fuel use, 100 tons with 20-ton reduction; utilities, 260 tons with 50-ton reduction; waste, 75 tons with 15-ton reduction; and fertilizer use, 6 tons with 1- or 2-ton reduction). That means a reduction goal of about 85 tons is quite reasonable.

If a moderate effort to reduce inputs occurs with BMPs and new low-cost technologies, then a conservative 20 percent to 25 percent reduction could be realized, with a total GHG reduction of about 85 tons.

The second course is a 27-hole private operation in central Canada, where golf is played seven or eight months per year. Its GHG emissions and targets are: fuel use, 110 tons with 25-ton reduction; utilities, 890 tons with 200-ton reduction; waste, 90 tons with 20-ton reduction; and fertilizer, 27 tons with 5-ton reduction.

On this course, about 250 tons of GHGs could readily be eliminated. How does one quantify the progress made?



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There’s much more to healthy turfgrass than exceptional green color and a quality look. Your turfgrass subliminally tells you that due to proper fertilization, disease management and the right amount of water, it’s in the best shape possible. This means your course looks great and plays even better, which makes everyone happy — even the guy looking to blame his poor golf game on your turf management skills. In many ways we say there is “more than meets the eye,” but this is apparent in golf course management. Good luck this season from everyone at Agrium Advanced Technologies.



With current environmental trends, no golf course will be exempt from pressures related to climate change.

Certification program

Par “0” is a certification program that promotes environmental stewardship and eco-efficiency in the golf industry. Par “0” allows golf operations to become environmental leaders. The program enables golf clubs to implement eco-efficiency plans to become carbon neutral.

Carbon-neutral golf operations will have a competitive advantage within the new low-carbon economy and will reap the benefits of being part of the GHG solution. We recommend a three-phased approach:

Phase 1: Quantify the carbon footprint.

Phase 2: Conduct an eco-efficiency assessment of the golf operations.

Phase 3: Implement changes to improve environmental performance and to reduce the environmental footprint.

The eco-efficiency business movement concentrates on courses becoming environmentally responsible and more competitive. Environmental performance is linked to financial performance, resulting in financial savings and a benefit to the environment. Eco-efficiency supports a corporate and social responsibility in a community where customers and consumers are concerned with environmental matters and responsibility.

Courses are recognized for GHG reduction at different levels:

■ **Bronze:** Given to operations that participated and have their carbon emissions (footprint) quantified, with recommendations to reduce their footprint.

■ **Silver:** Given to operations that have their carbon emissions footprint quantified and an on-site eco-efficiency assessment (with recommendations for improvement) conducted. The site-specific recommendations provide a roadmap to the business with respect to becoming carbon neutral over a period of time.

■ **Gold:** Awarded to companies that received both silver and bronze certificates and have reduced their carbon emissions from their operations and have become carbon neutral. Carbon-neutral status may also be achieved through purchasing high-quality carbon credits.

■ **Platinum:** This highest-level certificate is awarded to companies that have received bronze, silver and gold certificates and is based on the entire golf operations (clubhouse included) being carbon neutral through reducing emissions or by purchasing high-quality carbon credits. Platinum courses are carbon neutral and have accounted for their total operational carbon emissions as well as the carbon emissions embodied in the products/services they sell and use.

Reducing carbon footprint is like losing body weight — the formula is straightforward: Carbon footprint equals inputs minus carbon sequestered. The best results for reducing carbon footprint are realized by reducing your largest inputs. The high carbon inputs with the highest emission factors should be minimized or eliminated. These high-input areas are like the desserts or fatty foods one eliminates to lose weight. Primary greenhouse gases include (in order of highest to lowest emission factors) CFCs (from coolants/refrigerants), nitrous oxides (from fertilizer use), methane (from waste generated at course diverted to landfill), carbon (from fuel sources such as diesel, gasoline, propane, etc.), and utility power like electricity from coal, natural gas, nuclear sources.

John Jonasson has worked 30 years in the environment field in both the private and public sectors in Canada and the United States. His company's (EBSC Consultants) area of expertise includes environmental management systems, regulatory compliance, pollution prevention and greenhouse gas-reduction programs. Jonasson can be reached at john@ebscgolf.com.



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With tournament season approaching quickly, it's time to begin drying out the course and lowering the cutting heights. In order to obtain the most precise cut, make sure mower reels are sharpened and properly set, and ensure you have the most appropriate irrigation equipment for spot-watering. For more information on irrigation equipment and cutting-unit maintenance, contact your local John Deere Golf sales representative, or visit www.johndeere.com

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Here's More of the **Up-to-Date** **Technology** that Companies Showcased at the Golf Industry Show in February

Last month, we reported on the many new product introductions and updates. Here's **Part 2** of that report



Precision Laboratories introduces Uptake Technology, what the company says is an evolution in plant nutrition that produces healthy turf at lower use rates. Uptake Technology offers benefits in the categories of color, quality, tank-mixing, coverage and absorption, the company says. Uptake Technology is offered in seven analyses: 10-0-0-10Ca, 5-0-0-5Fe, 20-0-15, 15-15-15, 8-10-0-7B, 5-0-10, 3-0-25. These offer a broad range of N, P and K solutions, combined with a built-in adjuvant package for enhanced performance. Uptake Technology uses a concentrated formula, which results in low-use rates and less product to handle and store.

◀ **Underhill International** offers 2Wire Decoder Modules that convert Hunter ICC Controllers to two-wire operation. With a 2Wire system, a single pair of wires extends from the controller to each valve in the irrigation network. The technology has proved a cost-saving alternative on sites with a quarter-acre or more because it requires less copper wire, reduces installation time and labor, and facilitates system expandability, according to the company. Underhill also offers its TurfSpy turf stress-detection glasses to help

superintendents “see the future” by revealing potential problems before they are visible to the naked eye. TurfSpy lenses work by blocking out the green spectrum reflected from chlorophyll in healthy vegetation.

Syngenta Professional Products said Heritage G fungicide has received registration from the U.S. Environmental Protection Agency for use on turfgrass. Heritage G, featuring the carrier DG-Lite, is a systemic strobilurin fungicide in a granular formulation that controls more than 21 diseases during a 28-day window. Heritage G has been tested and proven effective against many turf diseases, including brown patch, red thread, pythium, anthracnose, gray leaf spot, snow mold, take-all patch, leaf spot, summer patch and necrotic ring spot. The fungicide has the same efficacy as the sprayable versions, Heritage WG and Heritage TL.

Another benefit of Heritage G includes a root-absorption method, which helps reduce accumulation of the product granules on grass leaf blades. The high solubility of the DG-Lite carrier allows the active ingredient to quickly and thoroughly reach the leaves.

Continued on page 53