



About the programme

GEO Certified™ is the symbol of great golf environments worldwide – an ecolabel credibly representing a golf club's commitment, efforts and results around sustainability, having met practical criteria in the areas of nature, water, energy, supply chains, environmental quality, and communities.

Widely endorsed by a growing number of golf organizations and people working in golf, GEO Certified™ is trusted as an effective and straightforward way for clubs to assess the work they're doing, improve where needed, and focus on continually improving, in a way that meets modern-day expectations and standards.

The ecolabel is administered by the Golf Environment Organization with funding and collaboration throughout the industry. The credibility of the ecolabel is assured through independent on-site verification every three years; transparency of criteria setting, evaluation processes, and reporting; an emphasis on continual improvement; and by working to a comprehensive definition of sustainability mapped specifically to golf. More in-depth information about GEO, credibility, transparency, governance, and ecolabel benefits can be found on golfenvironment.org.

This report is publicly available online and contains the information provided by Machrihanish Dunes Golf Club as well as the independent verifiers report and recommendations – ensuring transparency in reporting as well as a way for members, visitors and the wider community to read about the good work being done by the golf club.

About this Report

Publication of this report indicates that Machrihanish Dunes Golf Club has been assessed against the GEO Certification Criteria and awarded GEO Certified™ status.

Each section of this document covers a key area of environmentally sound golf facility management. As defined by the Golf Environment Organization, these are: Nature, Landscape & Heritage, Water, Turf, Waste, Energy, Education & Awareness and Management Planning.

To maintain this award Machrihanish Dunes Golf Club will be re-certified by a GEOSA Accredited Verifier before November 1st 2013.



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Facility Details

Machrihanish Dunes Golf Club is a daily-fee, resort golf facility comprising:

Courses

- Machrihanish Dunes Golf Club (18 holes)

Clubhouses

- The Golf House
- Machrihanish Golf Village

Maintenance Facilities

- The Bunkers

Other

- Pro Shop
- Practice Facilities
- Halfway House
- On Course Water Dispensaries and Litter Bins.
- Driving Range.
- Putting Green.
- Pitching Green.
- The Old Clubhouse Bar and Restaraunt.
- Machrihanish Post Office (Laundry, storage and staff accomodation).

Accommodation

- Kintyre Cottages - Self Catering (14 rooms)

Nature

The course is situated on the most extensive dune system in Kintyre. This consists of mobile dunes at seaward face to stable sandhills and hollows inland.

Plants- The dune slacks, behind mobile dunes (flooded in winter) contain 2 notable species: small-fruited yellow sedge and early marsh orchids (2 sub-spp).

The fixed dunes vegetated by fine-leaved grasses and herbs – lady's bedstraw and wild thyme are characteristic. Other notable plants which can be commonly seen are: frog orchid – beige to green/red flowers, common centaury - bright pink flowers, field gentian – purple flowers, bog pimpernel - pale pink flowers. This is the only site in Kintyre that supports the pyramidal orchid.



Other Wildlife- The plants also support many invertebrates: butterflies, moths, snails, bees and other insects. About a dozen birds breed. The most important is skylark, there is a big population here and their singing of skylarks is one of the evocative sounds in the dunes. The next largest populations are of meadow pipit and wheatear. Wheatears often nest in rabbit holes. 18 wheatear nest boxes have been installed in the dunes to keep this bird breeding. We also have a small population of sand martins which dig nesting burrows. Areas of open sand faces have remained undisturbed to retain these habitats. The birds of prey which hunt over the site are short-eared owl, peregrine, buzzard and raven. Other notable sightings include lizards, deer, fox and otter.

Out over the Atlantic Ocean are an array of seabirds including spectacular diving gannets and you can regularly spot bottle nose dolphin and porpoise.

Aims

Machrihanish Dunes Golf Club aim to maximise the ecological value of the course through careful management practices and conservation philosophies centered on nature.

Designations

Machrihanish Dunes Golf Club features areas that are designated or protected at the following levels:

- National Government
- Local Government
- Self Appointed
- S.S.S.I.
- Self designated informal wildlife sanctuaries.

Surveys

The following ecological surveys have been undertaken:

Title	Author	Date
Botanical	Environmental Statement	2004-04-01
Birds	Environmental Statement	2004-04-01
Mammals	Environmental Statement	2004-04-01
Invertebrates	Environmental Statement	2004-04-01



Amphibians	Environmental Statement	2004-04-01
Fungi	Environmental Statement	2004-04-01
Breeding Bird Survey		2004-04-01
Baseline surveys of flora, fauna and habitats.- Spring Summer 2004		2004-04-01
Annotated list of key species found- 2004, then updated for management plan in 2008. Map populations of early marsh orchids, pyramidal orchids and small-fruited yellowsedge and annually monitor the orchids. 2008 and annually.		2004-04-01
Fixed quadrat monitoring of roughs- July 2008 ongoing.		2008-07-01
Inhouse- Recording of species sightings by staff and golfers, ongoing. Lizards, Otter,Roe Deer, Fox, Barn Owl and Heron so far.		2004-04-01
National Vegetation Classification (NVC)		2004-04-01
Fixed quadrat monitoring of fairways- July 2007 ongoing.		2007-07-01
Birds, Edward McGuire, Machrihanish Seabird Observatory		2010-04-01
Description of habitats/vegetation types with plan- 2004 then updated for management plan in 2008. Calculation of natural/semi-natural areas. Natural - 62ha, Semi-natural - 7.5ha.		2004-04-01



Habitats

Estimated area of habitats at Machrihanish Dunes Golf Club:

- Rough 'ecological' grassland: 69.5 ha; of National Importance
- Wetlands: (Seasonal) 2 ha; of National Importance

Machrihanish Dunes Golf Club has undertaken the following activities to improve the landscape ecology of the site:

- Increase the size of habitat patches
- Connect internal habitat patches
- Connect patches with external habitats
- Create new habitat corridors
- Introduce a policy to avoid habitat fragmentation
- Improve and diversify habitat edges

Species

Rare, protected and notable species occurring at Machrihanish Dunes Golf Club [Latin names]:

- Machrihanish Dunes is the only station in Kintyre for the Pyramidal orchid, *Anacamptis pyramidalis*.
- Frosted orache, *Atriplex lacinata*
- Sand couch, *Agropyron junceiforme*
- Sea rocket, *Cakile maritima*
- Small fruited yellow sedge, *Carex viridula* spp. *viridula*.
- Early marsh orchid (a), *Dactylorhiza incarnata* ssp. *Coccinea*. (b) *D. incarnata* ssp. *incarnata*
- Lady's bedstraw, *Galium verum*
- Wild thyme, *Thymus drucei*
- Frog Orchid, *Coeloglossum viride*.
- Field Gentian, *Gentianella campestris*.
- Bog Pimpernel, *Anagallis tenella*.
- Ray's knotgrass, *Polygonum raii*
- Moonwort, *Botrychium lunaria*.
- Sand sedge, *Carex arenaria*.
- False fox-sedge, *Carex otrubae*.
- Common centaury, *Centaurium erythraea*.
- Lesser meadow-rue, *Thalictrum minus*.



- Wild pansy, *Viola tricolor*.
- Skylark (red listed), *Alauda arvensis*.
- Meadow pipit, *Anthus pratensis*.
- Sand martin, *Riparia riparia*.
- Wheatear, *Oenanthe oenanthe*.
- Peregrine, *Falco peregrinus*
- Short-eared owl, *Asio flammeus*. Snow bunting, *Plectrophenax nivalis*.
- Raven, *Corvus corvidae*.
- Buzzard, *Buteo buteo*.
- Otter, *Lutra lutra*.
- Mink, *Mustela lutreola*.
- Roe Deer, *Capreolus capreolus*.
- Six-spot burnet moth, *Zygaena filipendulae*.
- Cinnabar moth caterpillars, *Tyria jacobaeae*.
- Common blue butterfly, *Polyommatus icarus*.
- Smooth- meadow grass,
- Lady's bedstraw, *Galium verum*.
- Bird's-foot trefoil, *Lotus corniculatus*
- Self-heal, *Prunella vulgaris*.
- Ribwort plantain, *Plantago lanceolata*.
- Kidney vetch, *Anthyllis vulneraria*.
- Yellow rattle, *Rhinanthus minor*.
- Glaucous sedge, *Carex flacca*.
- Meadowsweet, *Filipendula ulmaria*.
- Lesser clubmoss, *Selaginella selaginoides*.
- Moss, *Tortula ruraliformis ssp ruraliformis*.
- Hen Harrier, *Circus cyaneu*.
- Scotch Argus, *Erebia aethiops*.
- Garden tiger moth, *Arctia caja*.
- Emperor moth, *Saturnia pavonia*.

Consultation

Machrihanish Dunes Golf Club consults with the following nature conservation organisations:

- Scottish Natural Heritage
- Natural Resource Consultancy



Activities

Machrihanish Dunes Golf Club has undertaken the following activities to enhance nature protection:

Activity	Description
Habitat protection.	(i) Environmentally sensitive areas staked to ensure no damage to orchid-rich areas during the flowering season.
Birdlife protection and enhancement.	(i) Protected sand martin nesting area. Self designated undisturbed area behind green on hole 5. (ii) Wheateater bird boxes installed and monitored. (iii) Local golf rules for nesting birds.
Habitat creation.	(iv) Allow rough vegetation to wrap around the back of tees and greens.
Habitat creation.	(iii) New seasonal wetland areas created.
Habitat protection.	(vii) Local golf rules for environmentally sensitive areas.
Habitat protection.	(viii) Education of golfers to potential risk of damage to ecosystem. 'Ecology insert' with stroke saver and scorecard.
Habitat protection.	(iv) Restricted use of golf buggies to trained course guides to limit wear.
Habitat creation.	(ii) Reduced mowing areas and frequency to increase biodiversity.
Habitat monitoring.	(i) Annotated list of key species found with rare or declining species and specially protected species.
Habitat creation.	(v) Creation of ecological corridors between habitat patches.
Habitat protection.	(vi) Minimal grass bays in optimal positions to reduce wear of maintenance. No scattering or dumping of grass clippings in grasslands.
Management actions.	(i) Strict adherence of operations within ecological legislation. Regular Scottish Natural Heritage visits to oversee this.



Habitat monitoring.	(vii) Evaluate the potential effects of climate change on the course. A sacrificial policy has been adopted in relation to dramatic erosion patterns (rising sea levels). Substitute tee/green/locations have been planned.
Management actions.	(ix) Construction Method Statement (CMS) prepared for larger scale projects, bunkers etc.
Management actions.	(ii) Employed Ecological Clerk of Works for construction projects. n.b. All improvements to the course are reviewed by Scottish Natural Heritage.
Habitat monitoring.	(iii) Monitor the effects of golf management on fairways using fixed quadrats. (same time each year)
Management actions.	(iv) PDOs List (Potentially Damaging Operations relating to the SSSI part of the site). All staff trained to follow these guidelines.
Habitat creation.	(vi) Micro-habitat construction using deadwood, brush piles, stone piles. Holes 9, 18.
Habitat protection.	(v) Maintenance routes in rotation system with standby routes to allow recovery of primary efficient routes.
Management actions.	(xii) Educating maintenance staff in potential risk of damage to ecosystem.
Habitat monitoring.	(vi) Calculation of natural/semi-natural areas. Natural - 62ha, Semi-natural - 7.5ha. 2004
Management actions.	(xiii) Management and senior staff education programme centred around ecology and enhancing biodiversity.
Habitat monitoring.	(ii) Monitoring changes in flora and fauna. Monitoring status of key species in relation to conservation actions undertaken.
Habitat creation.	(i) Retained areas of untouched rough grassland as undisturbed breeding and foraging habitat for small rodents.



Management actions.	(x) Site Rules and Regulations' document available to all contractors.
Management actions.	(vi) Environmental Statement produced.
Management actions.	(v) Environmental Impact Assessment carried out.
Management actions.	(ii) Employed Project Ecologist. Visiting a minimum of 4 annually.
Management actions.	(viii) Clearly stated aims- Machrihanish Dunes Golf Club aim to maximise the ecological value of the course through careful management practises and conservation philosophies centered on nature.
Management actions.	(xi) Public access route waymarked, rope fenced and chespale fencing across the foredune to the beach. Monthly monitoring.
Habitat monitoring.	(iv) Monitor the effects of golf management on out of play areas using fixed transects.
Flora.	(i) Map populations of early marsh orchids, pyramidal orchids and small-fruited yellowsedge and annually monitor the orchids.
Habitat creation.	(viii) Marram planting to stabalise tee banks, bunkers and definition of golf paths.
Habitat protection.	(ii) Signage installed at ecologically sensitive areas to educate and direct golfers. e.g. orchid area, sand martin nesting sites.
Management actions.	(vii) 5 Year Management Plan completed and reviewed annually (september) with Scottish Natural Heritage.
Habitat creation.	(ix) Reinstatement of bunkers within natural topography and vegetation cover. Hole 9, 17. Oct 2009.
Habitat creation.	(x) Reinstatement of old tee positions to natural topography and vegetation cover. 2nd Hole Jan 2010.
Flora.	(ii) Sheep/rabbits to maintain roughs.



Flora.	(iii) Native seeds only over sown. Native seed collection.
Habitat monitoring.	(vii) Communication of survey data to relevant bodies such as Scottish Natural Heritage, Argyll and Bute Council, Local Biodiversity Officer, Biological Recording in Scotland.
Habitat creation.	(xi) Undertaken annual removal of thickets and scarification of rough grassland to reduce coarseness, open up sward and increase botanical diversity. Holes 7, 10, 11, 17.
Limited chemical usage.	(i) No spraying of any chemicals. Apart from tees and greens. (ii) Organic Fertilizers only - and only used on tees/greens. (iii) Reduction programme for fertiliser use.
Flora.	(v) Reduce the proportion of these weeds in out-of-play roughs by 50% (maintaining food sources for certain invertebrates, including cinnabar moth).
Flora.	(iv) Ongoing elimination of ragwort, creeping thistle, spear thistle and nettles from all in-play areas by manual means.
Flora.	(vi) Native species used in decorative planting areas.
Birdlife protection and enhancement.	(iv) Introduction of perch points, nesting rafts for water areas and winter feeding stations.
Habitat protection.	(iii) Heavily restricted vehicle access to limit wear. Golf maintenance routes set out in advance by company ecologist and defined in management plan. Ongoing monitoring connected to all of these routes.
Habitat monitoring.	(v) Mowing/grazing regime trial plots within dune slacks to protect biodiversity. Encouraged by Scottish Natural Heritage. Holes 2,7.
Habitat protection.	(ix) Erosion prevention measures. Planting to bind fragile areas open to the elements (bunkers). This is limited on the mobile dune area. A sacrificial policy has been adopted in relation to dramatic erosion patterns.



Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for maximizing its ecological value:

- Machrihanish Dunes Golf Club aim to maximise the ecological value of the course through careful management practises and conservation philosophies centered on nature.

Landscape & Heritage

Machrihanish Dunes is a coastal location with breathtaking views over the Sound of Kintyre to Northern Ireland and the distinctive Jura hills and Islay. The sounds of crashing waves and seabirds along with the refreshing salt spray in the air rise up from the clear beach stretching out into the distance.

The small picturesque town of Machrihanish can be seen at the southern end of the bay. Rolling forested hills and historical agricultural land form the landward side of the course. Machrihanish Dunes is a natural golfing environment within a designated SSSI, it represents the type of land on which golf evolved in its simplest and most natural form.

The course also contains standing stones that may date back to the Bronze Age, 2000 BC. These are listed as a scheduled ancient monument, the standing stones of Clochkeil. Situated in a sheltered circular hollow on the links, are three stones, two of them erect, the largest of which is about 6 feet high above ground, and their relative positions might almost suggest that at one time they formed part of a stone circle. The nature of the site would also support this conclusion. The meaning of the adjacent farm name has been rendered Clach gheal, i.e. "the white stone," but as it is known by local Gaelic speakers as Clach-caol, signifying the "slender stone," it is not unlikely that this name originated from the presence of these standing stones.

Aims

Machrihanish Dunes Golf Club aim to maximise the landscape value of the course through careful management practises and conservation philosophies centered on the landscape and cultural heritage.

Designations

Machrihanish Dunes Golf Club features the following landscape designations:

- National Park
- Geological

Machrihanish Dunes Golf Club features the following cultural heritage designations and protected features:

- Buildings (Listed Buildings / Ancient Monuments etc)



Surveys

The following landscape assessments and appraisals been carried out at the site:

Date	Title
2009-10-26	Inhouse Initial Landscape and Heritage Assessment.
2009-10-26	Inhouse- Historical context data ongoing.
2004-05-31	Landscape Character and Visability Assessment carried out by Tyton Design Limited as part of Environmental Statement.
2009-10-26	Inhouse- External visual impact of site.
2009-10-26	Inhouse- Definition of landscape character and zones within site.
2009-10-26	Inhouse- Internal visual impact of site. With specific details of tees, fairways, greens, pathways, buildings, seating and course furnishings in relation to harmony with the existing landscape.
	All future construction projects must follow an archeological survey as part of the management plan.

The following archaeological and heritage surveys have been carried out at the site:

Date	Title
2009-01-16	Archaeological Assessment (Golf House)
2004-05-31	Archaeological Assessment of the site was carried out by GUARD, Glasgow University Archaeological Field Department.

Consultation

Machrihanish Dunes Golf Club consults with the following organisations on landscape and cultural heritage issues:

- Scottish Natural Heritage
- Argyll and Bute Council



Activities

Machrihanish Dunes Golf Club undertakes the following activities to enhance landscape and cultural heritage:

Activity	Description
Culture and Heritage Management.	(iv) Promotion and protection of the archeological interest thru signage, newly created pathways and seating focused around the Standing Stones area.
Culture and Heritage Management.	(i) Strict adherence of operations within Landscape and Heritage legislation. (ii) Research into cultural history of site. (iii) Research into Standing Stones.
Culture and Heritage Management.	(vii) Regular consultation with related bodies with the aim to research and communicate information to a wider audience. (viii) Annual review of landscape and cultural heritage issues in conjunction with our environmental policy.
Culture and Heritage Management.	(vi) Restoration and conservation of antique furniture and descriptions of cultural practices.
Culture and Heritage Management.	(vi) Industrial Dryer 1 ton, 8 foot high, cast iron appliance to be restored and shown with operational information. Salvaged from clear out operation- Antique furniture, embroidered pillow cases (1948) to be framed and displayed in new hotels.
Landscape Considerations.	(ii) Created sense of arrival along entrance road with mounded landforms and planting.
Landscape Considerations.	(iii) Screening of generator and caddie area with mounded landforms and planting.
Landscape Considerations.	(i) Visual Impact Assesments carried out for all construction changes from buildings and bunkers to litter bins.
Landscape Considerations.	(v) Long views created with seating areas enabling a real connection to the surrounding landscape.
Landscape Considerations.	(vi) Contoured cutting lines on mown areas to fit with landscape.



Landscape Considerations.

(iv) Avoidance of light pollution around buildings with low level motion sensor and timed systems.

Landscape Considerations.

(vii) Attention to colours, styles, equipment, paths/roads, advertising, signage, furniture and materials used; e.g. for buildings.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for conserving or enhancing its landscape and cultural heritage value:

- Machrihanish Dunes Golf Club aim to maximise the landscape value of the course through careful management practices and conservation philosophies centered on the landscape and cultural heritage.

Water

Machrihanish Dunes follow an environmentally responsible management approach to our water resources with the aim of minimising water use and to protect and enhance water quality in and out of our course.

Irrigation water from 19 well points is pumped a short distance to the course. This groundwater source is also used in the Golfhouse. Impoundment & Abstraction Licenses are obtained annually from SEPA. Consumption figures for the golf course for 2009- 192473L. 2008- 571693L as part of the grow-in. These consumption figures will be used to develop reduction targets for 2010.

A modern and fully automatic irrigation system only operates at night. We only irrigate greens and tees when needed. Handwatering is carried out to optimise water efficiency in high winds.

All waste water and runoff is directed to the catchment and treatment areas contained at MOD Machrihanish after leaving the property.

We annually review Water Resource issues in conjunction with our environmental policy.



Consumption

Water sources

	Primary Source	Secondary Source (if used)
Clubhouse	Public / Potable	N/A
Golf Courses	Groundwater	N/A
Accommodation	Public / Potable	N/A
Maintenance facility	Public / Potable	Groundwater
Other	Groundwater	N/A

Water consumption (m3)

	2009	2009	2008
Clubhouse	N/A	N/A	N/A
Golf Courses	N/A	1924	571
Accommodation	N/A	N/A	N/A
Maintenance facility	N/A	N/A	N/A
Other	N/A	N/A	N/A



Irrigation

The following areas are irrigated:

Area name	Approx. Hectarage
Greens	1.5 ha
Tees	1 ha
Golf House	0.5 ha
Golf Village	0.5 ha

Machrihanish Dunes Golf Club irrigation system is Fully computer controlled.

This irrigation system is serviced every **12 months**.

This irrigation system is calibrated every **1 years**.

Our greenkeeping staff incorporate evapotranspiration rates and weather data into their irrigation programme:

We have the Toro site pro system with a vantage pro2 weather station that works out ET rates automatically daily - our irrigation programs and water input are worked out accordingly.

Machrihanish Dunes Golf Club monitors soil water content to minimise irrigation and improve turf quality.

Analysis

Machrihanish Dunes Golf Club undertakes environmental monitoring of water quality.

	Chemical	Biological	Last Test Date	Tester
Inflow	Yes	Yes	2007-06-01	Greentech
On-site	Yes	Yes	2010-07-01	SEPA
Outflow	No	No		

The key findings of these tests were:

The water source through data was found to be of good enough quality to irrigate greens and tees without any adverse affect.



Activities

Machrihanish Dunes Golf Club has undertaken the following activities to conserve / reduce / minimise water consumption:

- Minimise irrigated area
- Irrigate in the evenings
- De-compact the soil
- Grass species selection
- Regular inspections for irrigation system leaks
- Soil moisture analysis
- Use of wetting agents
- Gathering of evapotranspiration data
- Mulch cover and only water decorative planting in severe drought conditions.
- Regular servicing, calibration and upgrading of irrigation system.
- Low/adjustable trajectory nozzles reducing wind effects.
- Observe and map areas that have different water use patterns based on turf response to dry periods.
- Hose with a shutoff nozzle if washing all equipment and machinery with water. Use pressurized air to clear clippings.
- Rainwater collection and re-use.
- Installation of screens and windbreaks in exposed areas.
- Record rainfall and temperature for seasonal and annual comparisons.
- Clearly stated aims- Machrihanish Dunes follow an environmentally responsible management approach to our water resources with the aim of minimising water use and to protect and enhance water quality in and out of our course.

Machrihanish Dunes Golf Club undertakes the following activities to protect and enhance water quality:

- Creation of swales and attenuation areas
- No spray zones
- Erosion control
- Pest and disease tolerant grass selection
- Informed selection of fertiliser type
- Informed selection of pesticides (least toxic, least persistent)
- Identify where all waste water and runoff flows.
- Spill procedures internally or entering site from upstream.
- Filter wash water and other outflows.



- Increased water storage.
- Prevention of grass clippings to enter water bodies.
- Regular environmental monitoring of water quality. Samples sent to STRI. pH also monitored regularly.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for conserving water quality and minimizing water consumption:

- Machrihanish Dunes follow an environmentally responsible management approach to our water resources with the aim of minimising water use and to protect and enhance water quality in and out of our course.

Turf

Machrihanish Dunes Golf Club aims to minimise its resource inputs and reduce pollution risks through environmentally sound management of turf achieving high quality playing surfaces.

Eighteen greens, practice putting green, pitching green, five tees per hole and driving range tee have established from 2008. Three greens have been turfed with all others grown in with fescue suitable for local soils and climate. All are constructed by shaping the existing pure sand. These greens consists primarily of fescue (Chewings and slender creeping red) and brown top bent. Tees have the same composition as greens. Fairways are naturally occurring varieties. We sow greens and tees only, with fescue and brown top bent several times each year to reduce consumption of water, fertilisers and pesticides.

Results monitored constantly and annually reviewed in conjunction with our environmental policy.

Machrihanish Dunes Golf Club maintains the following turfgrass species:

Greens

- Fescue (*Festuca rubra*)
- Browntop bent (*Agrostis tenuis*)

Surrounds & Approaches

- Fescue (*Festuca rubra*)
- Annual meadow-grass (*Poa annua*)

Tees

- Fescue (*Festuca rubra*)
- Browntop bent (*Agrostis tenuis*)



Fairways

- Fescue (*Festuca rubra*)
- Annual meadow-grass (*Poa annua*)

Semi-rough

- Fescue (*Festuca rubra*)
- Annual meadow-grass (*Poa annua*)

Machrihanish Dunes Golf Club regularly undertakes the following practices to improve turf health:

- Hollow Coring - 2 times per year
- Top Dressing - 7 times per year
- Micro Tining - 6 times per year
- Scarification - 1 times per year
- Verticutting - 1 times per year
- Deep Anti Compaction - 2 times per year
- Rolling - 20 times per year

Nutrition

Our nutrition programme is timed to maximize uptake by the grasses, limiting factors such as light, temperature, moisture and growing season. Soil tests and plant tissue tests obtain information in order to streamline applications.

Greens-Applications of liquid feed as required. (approximately 2 applications of granular slow release. 30 - 60kg of Nitrogen per hectare per year.) At 2010 during the grow in phase higher amounts are anticipated. Wetting Agent 8 applications.

Tees-Liquid feed as required. (approximately 2 applications of granular slow release. 30-60kg of Nitrogen per hectare per year). Wetting agent 4 applications.

Results monitored constantly and annually reviewed in conjunction with our environmental policy.

The greenkeeping staff feed the following areas of the golf course:

- Greens
- Tees
- Driving Range tee

Machrihanish Dunes Golf Club GEO Certified™ Report 2010



The nutrition programme at Machrihanish Dunes Golf Club is informed by:

- Leaf Tissue Analysis
- Soil Analysis
- Visual Appearance
- Sward Density
- Rooting Depth

Fertiliser use in 2009

	Nitrogen (kg/year)	Phosphate (kg/year)	Potassium (kg/year)
Greens & surround	100	10	60
Tees	60	4	58
Fairways	0	0	0
Semi Rough	0	0	0
Rough	0	0	0

Fertiliser use in 2009

	Nitrogen (kg/year)	Phosphate (kg/year)	Potassium (kg/year)
Greens & surround	0	0	0
Tees	0	0	0
Fairways	0	0	0
Semi Rough	0	0	0
Rough	0	0	0

Machrihanish Dunes Golf Club has no further fertiliser data.



Pest & Disease Control

With Machrihanish Dunes being situated on a SSSI it has been agreed within the planning restraints that greens and tees can be managed how we see fit, but due the sensitive nature of the site we use cultural methods to control any weeds - these include hand weeding or trying to reduce compaction where possible. Coring, verticutting, vertidrainning and well timed topdressing to limit disease conditions. Chemicals are only used as a last resort and only on greens and tees.

A comprehensive log is kept for disease occurrences and pest outbreaks.

Pesticide use:

- Fungicides - If Necessary
- Herbicides - If Necessary
- Insecticides - Never
- Lumbricides - Never
- Growth Regulator - If Necessary

Machrihanish Dunes Golf Club keeps detailed records of pesticide application.

Pesticide use in 2009

	Fungicide		Herbicide		Insecticide	
	Active ingredient	kg	Active ingredient	kg	Active ingredient	kg
Rough			2,4-D, Dicamba	3		

Machrihanish Dunes Golf Club has no further pesticide data.

Pesticide use in 2008

Thresholds for using pesticides at Machrihanish Dunes Golf Club:

To pre-determined thresholds / degrees of damage

Machrihanish Dunes Golf Club selects pesticides with the following attributes:

- Toxicity - Low
- Persistence - Low
- Solubility - Low
- Specificity - High



Scouting at Machrihanish Dunes Golf Club:

	Frequency / month	Scout
Greens	30	Superintendent
Tees	20	Superintendent
Fairways	10	Superintendent
Semi Rough	4	Superintendent

Activities

Machrihanish Dunes Golf Club undertakes the following activities to minimise / reduce pesticide use:

Activity	Description
Cultural methods.	(i) STRI - Regular tissue and soil analysis to improve plant nutrition programme.
Limited Chemical use.	No spraying of any chemicals. Apart from tees and greens.
Limited Chemical use.	(iv) Defined tolerance thresholds for specified pests and diseases most likely to occur. Keeper of the greens and senior staff visual assessment. As a guideline 20% loss of cover or localised areas.
Limited Chemical use.	(v) We aim to use the least toxic forms of pesticide, least persistent and best targeted. (vi) Adjustment of pH in areas vulnerable to pests and disease. (vii) Weedstick application only on roughs.
Cultural methods.	(ii) Timing of maintenance to reduce possibility of disease. (iii) Seasonal adjustment of cutting heights (increasins to relieve stress on turf.
Cultural methods.	(vi) Hand weed all greens/tees. (vii) Hand pulling all ragwort. (viii) Weed control on the estate is by hoeing, handweeding, bark mulching or herbicide. (ix) Worms cast are usually tolerated on all playing surfaces as only a problem on greens.



Fertilizing policy	(i) Use of organic fertilizers on greens and tees only - no other fertilizer permitted on site. (ii) After course has matured and grown in - reduce steadily the fertilizer input to continue to promote finer grasses.
Cultural methods.	(iv) Coring, verticutting, vertidrainning and the timing of topdressing to limit disease conditions. (v) Reducing compaction levels.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for achieving high quality playing surfaces in an environmentally responsible manner:

- Machrihanish Dunes Golf Club aims to minimise its resource inputs and reduce pollution risks through environmentally sound management of turf, thus achieving high quality playing surfaces.

Waste

Machrihanish Dunes Golf Club is committed to a structured, comprehensive and quantifiable approach to waste management.

We follow the main principles -

Waste prevention via assessment of materials consumed and purchasing policies.

Recycling and reuse through separation and storage.

Minimising disposal and monitoring.



Management

Waste streams for Machrihanish Dunes Golf Club

	Avoid	Re-use	Recycle	Landfill	Incineration	Registered Uplift	2009 Totals (kg)
Glass	Yes	No	Yes	No	No	No	0
Plastic	Yes	No	Yes	No	No	No	0
Aluminium	Yes	No	Yes	No	No	No	0
Metal	Yes	No	Yes	No	No	No	0
Paper	Yes	No	Yes	No	No	No	0
Cardboard	Yes	No	Yes	No	No	No	0
Electrical	Yes	No	Yes	No	No	No	0
Grass Clippings	Yes	Yes	Yes	No	No	No	0
Cores	Yes	Yes	Yes	No	No	No	0
Turf	Yes	Yes	Yes	No	No	No	0
Sand	Yes	Yes	Yes	No	No	No	0
Wood / Timber	Yes	Yes	Yes	No	No	No	0
Leaves	Yes	Yes	No	No	No	No	0
Detergents	Yes	No	No	No	No	Yes	0



Cooking Oils	Yes	No	Yes	No	No	Yes	0
Lubricants	Yes	No	No	No	No	Yes	0
Pesticide Containers	Yes	No	No	No	No	Yes	0
Fertiliser Bags	Yes	Yes	Yes	No	No	No	0
Oil Filters	Yes	No	No	No	No	Yes	0
Batteries	Yes	No	Yes	No	No	Yes	0

Machrihanish Dunes Golf Club has secure storage for hazardous material.

Site1 Maintenance Facility (The Bunker)

Diesel is stored in an over ground tank with a spill basin. Inspected by SEPA guidelines and are given certificates of compliance.

Petrol storage is in sealed containers in a separate room with catch basins.

Chemical storage is in a seperate room in a secure chemical safe also with required catch basins. Up to date register of all hazardous products stored on-site.

All apparatus and signage regarding spillages prominent at filling points. Designated staff trained accordingly.

Preplanning for hazardous waste is routine and disposed of according to existing legislations. On course- Spillage action plan and oil clean up kit.

Surveys

Machrihanish Dunes Golf Club has not undertaken a waste audit.



Waste Water

Machrihanish Dunes Golf Club manages its water as follows:

	Discharges to:	Legally Compliant?	Formal Discharge Agreement
Clubhouse	Mains Sewer	Yes	N/A
Accommodation	Mains Sewer	Yes	N/A
Maintenance Facility	Mains Sewer	Yes	N/A
Wash Pad	Ditch	Yes	N/A

Activities

Machrihanish Dunes Golf Club undertakes the following activities to reduce resource consumption or minimise waste:

Waste Actions.

- (i) Calculation of waste through auditing.

Waste Education.

- (i) Education of staff in company waste procedures. (ii) Signage located to prompt waste saving activities and educate staff on company policy.

Management Philosophy.

- (i) Local and natural materials used as a priority. E.g. Natural stone tee furnishings selected from local quarry, Driftwood directional markers sourced from adjacent shoreline. (ii) Green purchasing policies, communicated through our supply chain.

Waste Actions.

- (ii) On site recycling station. (iii) Tees recovery and re-use system. Along with biodegradable tees available to golfers. (iv) Printer and toner cartridges recycled.

Waste Education.

- (iii) Waste awareness campaign. (iv) Cross-pollination of initiatives and waste philosophies across departments, facilities and interpretation within the global company structure.



Waste Actions.

- (v) Staff advised to limit Christmas cards waste to colleagues. (vi) Footer message on email to discourage unnecessary printing. (vii) Staff routing slips rather than several copies.

Waste Actions.

- (viii) Opening packages carefully as not to damage potentially re-usable packing cases.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for reducing, re-using and recycling waste, and minimizing resource consumption at source:

- Machrihanish Dunes Golf Club is committed to a structured, comprehensive and quantifiable approach to waste management aiming to reduce waste and minimise resource consumption.
- We aim to be a leader in sustainable development and management through innovation. As a benefit to the whole golf sectors acceptance of responsibility, Machrihanish Dunes will be a high-profile vehicle to promote the concepts of sustainability and adoption of these principles without compromising the fundamental needs of the game itself. With sustained promotional campaigns we are an interface between governmental and non-governmental agencies, environmental organisations and other related industries such as sport, horticulture and tourism.

Energy

Machrihanish Dunes Golf Club is committed to carrying out an energy efficiency programme.

The main objectives are as follows:-

To establish how much energy is being used.

To compare externally to similar golf clubs and internally between departments and over time periods.

Lead by example in awareness and energy efficiency.

Set performance targets and monitor success.

Help place the golf sector in the forefront of the sustainability agenda by demonstrating environmentally responsible management.

Consumption

Energy and fuel use in 2009

- Electricity - 480010 Kwh
- Diesel - 9000 Litres
- Petrol - 3000 Litres

Energy and fuel use in 2008

- Petrol - 4000 Litres



Machrihanish Dunes Golf Club has not taken any measures to diversify energy or fuel supply.

Surveys

Machrihanish Dunes Golf Club has not undertaken an Energy Audit.

Carbon

Machrihanish Dunes Golf Club has not begun to carbon footprint its operations.

Purchasing Policy and Sustainable Supply Chains

Machrihanish Dunes Golf Club informs suppliers of its environmental preferences:

Communicate through our supply chain of our Green purchasing policies, to reduce consumption and resultant waste, with the aim to motivate our suppliers to do likewise.

Source locally from local producers and manufacturers.

Restrict regular suppliers to fixed days to reduce transport miles.

Ask our supplier to send goods in returnable containers where possible and to take empty packaging back when they deliver new stock.

Purchasing policy for Machrihanish Dunes Golf Club

(1 = not important; 5 = very important)

- Performance Quality - 5
- Price - 4
- Supplier Service - 5
- Durability - 5
- Energy Efficiency - 5
- Recycleability - 5
- Pollution Risk - 5
- Packaging - 5
- Disposability - 5
- Local Produce - 5



Activities

Activities undertaken to record energy consumption:

- Billing documents and meter reading.
- Listing of principal energy consuming activities.
- Carbon footprint calculated.
- Transport audit.
- Research into solar, wind and ground heat source.
- Energy audit planned for 2010.

Activities undertaken to reduce energy consumption:

- Insulation.
- Training on cultural practices.
- Event planning measured in terms of carbon footprint.
- Staff car-share system.
- Low energy timed/motion sensor lighting systems.
- Steps to improve insulation and heating efficiency.
- Available covered and secure bicycle storage.

Green purchasing activities undertaken:

- Biodegradable/recycled material golf tees.
- Rechargeable Battery powered Buggies for golfers of limited mobility.
- Course/Golf Village furniture. The wood is sourced from sustainable forest in Northern Europe to fit with our environmental policy.

Departments involved in energy saving activities:

- Golf House.
- The Old Clubhouse.
- Kintyre Cottages.
- Maintenance sheds.
- Machrihanish Post Office.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for reducing energy use and moving towards cleaner and renewable energy supplies:

- Machrihanish Dunes Golf Club is committed to carrying out an energy efficiency programme aiming to minimise resource consumption.



Education & Awareness

Knowledge

Employees of Machrihanish Dunes Golf Club receive the following formal and informal environmental education:

- Pesticide storage, application and disposal
- Efficient water management
- Emergencies / accident management
- Habitat and vegetation management
- Waste minimisation, separation and recycling
- Health and safety
- Energy
- Landscape and cultural heritage issues
- Environmental management planning
- Plant Identification Test (particularly rare species to avoid damage)
- Ecology Induction.
- Ecology Written Test.
- Company Background Written Test.
- Golf History Written Test.
- Working Procedures/Theory Written Test.
- Emergency incident plan, in accordance with national environmental and health and safety regulations.
- Management education regarding each GEO certification category.

Machrihanish Dunes Golf Club keeps formal staff training records for these departments:

- Greenkeeping
- Administrative
- Catering
- Accommodation

Machrihanish Dunes Golf Club keeps the following record of accidents in the workplace:

- Number
- Type
- Severity

Response plans for accidents and emergency situations at Machrihanish Dunes Golf Club

- (i) Fire Plan that is displayed around maintenance buildings and all new employees inducted.
- (ii) Accident plan is displayed with list of 1st aiders along with the location of 1st aid boxes.



Communications

Machrihanish Dunes Golf Club undertakes the following internal environmental communications:

- Newsletters
- Course walks
- Displaying awards
- Notice boards
- Poster displays
- Course guides / brochures
- On-site interpretation panels
- Eco tables
- Magazine table
- Course signage
- Nature trail
- Ecology Information Insert provided with Scorecard and Yardage Book.
- Internal interpretation panels.
- Environmental area in golf house.
- Web links to environmental sites.
- Environmental area in office with all relevant documentation filed and an environmental dossier available on request.
- DVD and film shown to visitors as an introduction during complimentary bus transport. Also available online and shown in public areas.
- DVD available of Kintyre wildlife.
- Website ecology section with regular updates.

The most successful internal communications project at Machrihanish Dunes Golf Club has been:

Major project to encourage cross pollination of initiatives and waste philosophies across departments, facilities and for interpretation within the global company structure.

Machrihanish Dunes Golf Club undertakes the following external environmental communications:

- Website
- Course walks / Open days
- Press releases
- Attending community meetings
- Brochures
- Joint practical projects with community



- School Information Visits.
- Close links with local environmental groups.
- Communication of environmental survey data with relevant data groups.
- Communication of environmental policies with environmental bodies. S.N.H.
- Communication of environmental procedures and activities with golfing bodies; GEO, SGEG, R&A, BIGGA, IOG, individual golf courses and networking golf websites.
- Ongoing communication with experts in the field of new environmental products and procedures. Building up a environmental network.

The most successful external communications project at Machrihanish Dunes Golf Club has been:

- (i) School Information Visits and study tours including helping set up extra wheateater nests/ beach cleans attended by Machrihanish dunes representatives.
- (ii) Participate in Visit Scotland activities where the project is showcased.
- (iii) Numerous conferences have been attended where Machrihanish Dunes has aimed to educate and inform the strength of the ecological policies.

Partnerships

Machrihanish Dunes Golf Club works with the following external groups:

- Local environmental groups
- Neighbours
- Media
- Local government
- Local community groups
- Schools
- Local businesses
- Authorities
- Colleges
- Major project to encourage cross pollination of initiatives and waste philosophies across departments, facilities and for interpretation within the global company structure.

The most successful partnership project at Machrihanish Dunes Golf Club has been:

S.N.H. have been actively been invloved through the planning/construction and after management of the site. Regular site visits and communications are ongoing and vital to the preservation of the SSSI.



Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for educating and raising environmental awareness amongst staff and golfers:

- We aim to be a leader in education and raising environmental awareness through innovation. As a benefit to the whole golf sectors acceptance of responsibility, Machrihanish Dunes will be a high-profile vehicle to promote the concepts of sustainability and adoption of these principles without compromising the fundamental needs of the game itself. With sustained promotional campaigns we are an interface between governmental and non-governmental agencies, environmental organisations and other related industries such as sport, horticulture and tourism.

Management Planning

Environmental Management Plan

Machrihanish Dunes Golf Club has an Environmental Management Plan covering:

- Nature
- Landscape & Culture
- Water
- Turf
- Waste
- Energy
- Education & Awareness

The Management plan was first introduced: **2004-04-01**

Machrihanish Dunes Golf Club review the management plan every:

- 5 Years

Machrihanish Dunes Golf Club monitor the progress of the scheme as follows:

Machrihanish Dunes GC management and maintenance practices will adhere to the Management Plan for the next five years to gain continuity in practice. Any changes in this period are discussed with project ecologist and agreed with the management group. Agreed changes to form supplements to the management plan. This commitment will be restated within subsequent 5 year plans.



Working Group

Machrihanish Dunes Golf Club has an environmental working group, comprising the following individuals/organisations:

- General Manager
- Course Manager
- Technical Specialist
- Local Government
- Local Environmental NGO

Accreditation

Machrihanish Dunes Golf Club belongs to the following accreditation or award schemes:

- Other

Key national environmental legislation with which Machrihanish Dunes Golf Club complies:

- S.S.S.I. S.N.H.
- S.E.P.A.
- Scottish Environment Protection Agency (SEPA), the 'National Waste Strategy: Scotland'
- S.E.P.A.
- S.E.P.A.

Aims & Objectives

Machrihanish Dunes Golf Club has the following key objectives for effectively planning its proactive and long-term environmental management:

- We intend to enhance both the ecological value and pure recreational enjoyment of our exceptional course, to ensure that our example will showcase golf to the world.



Verifier Report

My visit to Machrihanish Dunes has confirmed that even in the most sensitive of sites such as this SSSI designated area, this golf development not only protects the special habitats in which it exists, but enhances and improves the ecological value of the area while at the same time providing a wonderful natural links golf experience for visitors.

The management team have taken the challenges of addressing the planning conditions set and turned them into positive strengths of the course, with long term action plans in place to manage and monitor the habitats and species.

Addressing nature, landscape, heritage and turf management issues successfully have ensured the course produced is of the highest standard, in harmony with the land. Policies of water, waste and energy resource efficiency, along with low chemical use, show the all-round sustainability of the facility.

Carolyn Hedley, GEO Accredited Verifier

Observations

Nature

Prior to construction, a range of ecological habitat and species surveys were conducted and the information gathered was used during design and construction and on-going management. This is ensuring the preservation of key ecological grassland habitat areas and the many rare, protected and notable species (e.g. 5 types of rare orchid) that make up this SSSI and special area of Scotland's natural heritage.

By engaging regularly with SNH and ecological specialists Natural Resource Consultancy, Machrihanish Dunes management team are actively demonstrating that they are continually working with the natural habitats to enhance and improve the ecological value of the site. Management practices are resulting in improvements e.g. habitat patches increasing and new connections and corridors are being connected to avoid fragmentation. Mowing /grazing regimes in key areas are being trialled in key dune slacks to protect biodiversity.

Landscape & Heritage

This coastal dune landscape is a prime example of the type of land where golf originally was played, so this was already an area ideal for creating a natural links golf experience. Landscape assessments and appraisals were carried out and subsequent designs and routing utilised the natural undulations of the dunescape, the protected habitats and thus required minimal amounts of earth movement and shaping during construction resulting in minimal disruption of the natural habitats. Landscape character zones are defined and long views created to maximise the landscape value of the site.



The course also includes Scheduled Ancient Monuments which through external consultation are being protected and promoted.

The management team have demonstrated a good understanding, and positive protection improvement and promotion of the landscape and cultural heritage of the course.

Water

Water use on the course is from a groundwater source and the new irrigation system enables the optimisation of irrigated areas through computer controlled sprinkler head control and use of an on site weather station. Soil moisture content and temperature monitoring, hand watering and other good turf management also helps to minimise water use. Machinery wash water is filtered and quality of surface water on the course is monitored and protected by having no-spray and buffer zones. Accident /spill protocols are in place and staff aware. The newly constructed buildings of the facility contain many water efficiency measures and the management have aims to ensure the new clubhouse and maintenance facility will use the minimum amount of mains water when they are built.

Turf

Fairways on the course are of naturally occurring species varieties, with only the tees and greens shaped and seeded with fescues and brown top bent. The turf maintenance policy for the course is to minimise resource inputs as data presented to me demonstrated, with minimal nutritional feeds on the greens and tees only when necessary. Cultural management techniques e.g. hollow coring, top dressing, micro tining, verticutting and rolling are undertaken for turf health and to limit disease. Chemical pest and disease control is only used as a last resort when necessary to pre-determined tolerance thresholds. Rough grassland management is also assisted by the flocks of sheep allowed to graze on the course in the off season.

Waste

Machrihanish Dunes follow the waste hierarchy principles of reduction, reuse and recycle wherever possible to reduce the amount of waste going to landfill. They have presented good records of quantities and management practices for each waste stream with separation procedures evident in the staff areas. Sustainable procurement practices are in place with local, sustainable and recycled products being used where possible. Hazardous and chemical substances are stored and disposed of correctly and waste water is filtered prior to discharge to sewer. The management team aim to increase their waste management practices when the new clubhouse and maintenance facility are completed with external specialist audits and advice where possible.



Energy

Energy consumption monitoring and efficiency measures are in place for the facility and all newly built areas have minimised energy consumption. The age and condition of the existing maintenance facility are a limiting factor in this category but they aim to increase focus on this area when the new clubhouse and maintenance facility are built as these will be audited externally and designed to be highly efficient. There is also an aim to research the future use of alternative sources such as solar, wind and geothermal energy.

Education & Awareness

Internal education and awareness is of a high standard with all staff, contractors being given detailed environmental information during inductions, formal and informal education and on staff notice boards. Accident and emergency procedures are communicated with all staff and contractors.

Golfers and visitors have access to information via the website, newsletters etc and there are plans to have more information on display and for visitors. There are close links and partnerships with external environmental groups and local community groups and there have been school study visits. Utilising the high-profile of the course will help achieve their future aims to promote sustainable management within a SSSI to golfers and externally.

Management planning

Documentation Reviewed

- Environmental policy
- Environmental management plan
- Action plans & project proposals
- Certification report
- External surveys and reports
- Internal reports
- EIA statement
- Emergency incident plan
- Environmental data
- Register of accidents
- Training log
- Awareness raising materials



Conclusions

My visit has confirmed that Machrihanish Dunes is indeed a very special golf course. Although under constraints from the SSSI designation, the design, construction and management of the course is in my opinion an exemplar of sustainable golf course management, going beyond what is required to produce an excellent links golfing experience.

Particular credit has to be given for the impressive efforts in the Nature, Landscape & Heritage and Turf categories and they have made great progress in Education & Awareness of the key issues.

The other categories of Water, Waste and Energy have been addressed well considering the new clubhouse and maintenance facility are still being planned.

The pride, enthusiasm and commitment to environmental issues amongst the staff is to be commended (especially Keith Martin and David Windram with whom I met).

Recommendation

I Carolyn Hedley, Golf Environment Organization Accredited Verifier, recommend that be awarded GEO Certified status for excellence in environmental management.

About this Report

This report represents the opinion of an independent environmental professional accredited by the Golf Environment Organization. The environmental performance of was assessed against the GEO Certification criteria.