



LORNE GILL/SNH

GLENEAGLES GOLF COURSE

DEFINITION

Golf courses in Tayside cover a wide range of landscape types that include:

- Parkland
- Heathland
- Woodland
- Links (Sand Dunes)
- Designed Landscape

These areas offer unique opportunities for habitat and species development, not only in terms of their own natural features, but also to the wildlife corridors that they can provide. Golf courses are unique in that they can provide a safe haven for flora and fauna in recreational areas not commonly considered to be conservation habitats.

Golf courses cover a variety of landscape designations. In many of these areas golf courses act as invaluable 'green lungs' protecting land from industrial or housing development and contributing greatly to the quality of life to local residents and visitors alike.

CURRENT STATUS AND EXTENT OF HABITAT

Nationally there are 460 golf courses. In Tayside there are 45 golf courses; these fall within a number of habitat types each with the potential to contain a very wide array of species.

Past management practices have rendered many golf courses void of any conservation value. More and more golf courses are, however, being managed sustainably with new techniques conserving water and lowering the need for pesticides. Many golfers welcome the increasing variety of wildlife on their course.

KEY SPECIES

P = UK Priority species **C** = UK species of conservation concern

Mammals	Roe deer	<i>Capreolus capreolus</i>	C
	Badger	<i>Meles meles</i>	C
	Fox	<i>Vulpes vulpes</i>	
	Otter	<i>Lutra lutra</i>	P
	Red squirrel	<i>Sciurus vulgaris</i>	P
	Pipistrelle bat	<i>Pipistrellus pipistrellus</i>	P
	Brown long-eared bat	<i>Plecotus auritus</i>	C
Birds	Buzzard	<i>Buteo buteo</i>	C
	Barn owl	<i>Tyto alba</i>	C
	Short-eared owl	<i>Asio flammeus</i>	C
	Tawny owl	<i>Strix aluco</i>	C
	Kestrel	<i>Falco tinnunculus</i>	C
	Osprey	<i>Pandion haliaetus</i>	C
	Sparrowhawk	<i>Accipiter nisus</i>	C
	Capercaillie	<i>Tetrao urogallus</i>	P
	Black grouse	<i>Tetrao tetrix</i>	P
	Oystercatcher	<i>Haematopus ostralegus</i>	C
	Curlew	<i>Numenius arquata</i>	C
	Heron	<i>Ardea cinerea</i>	
	Fieldfare	<i>Turdus pilaris</i>	C
	Redwing	<i>Turdus iliacus</i>	C
	Yellowhammer	<i>Emberiza citrinella</i>	C
Amphibians	Common frog	<i>Rana temporaria</i>	C
	Common toad	<i>Bufo bufo</i>	C
	Newt spp.		C
Invertebrates	Small tortoiseshell butterfly	<i>Aglais urticae</i>	
	Ringlet butterfly	<i>Aphantopus hyperantus</i>	
	Meadow brown butterfly	<i>Maniola jurtina</i>	
	Bumble bee spp.		
Plants	Oak spp.		
	Scots pine	<i>Pinus sylvestris</i>	
	Juniper	<i>Juniperus communis</i>	P
	Cowslip	<i>Primula veris</i>	
	Ragged robin	<i>Lychnis flos-cuculi</i>	
	Northern marsh orchid	<i>Dactylorhiza purpurella</i>	

NATURE CONSERVATION IMPORTANCE

Golf course management involves much more than just managing turfgrass. Winter maintenance, particularly on Scottish golf courses makes up the bulk of the management programmes that encompass some, if not all of the following:

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Woodland Management

Trees provide definition for fairway edges or low maintenance areas in and around golf courses. In addition they provide valuable wildlife habitats and corridors.

In wet areas Willow *Salix caprea* and Alder *Alnus glutinosa* are found, whereas in better-drained soils Scots Pine *Pinus sylvestris* and Silver Birch *Betula pendula* are often present. Trees not susceptible to ball damage are also better for obvious reasons; these include Oak, Ash, Pine and Lime.

A mix of ages and species creates a greater variation in the genetic stock, lessening the risk of the spread of disease and loss of trees through wind damage. Such a variety of tree types and maturity provides a range of canopy heights and provision of habitat areas. Where safe, dead timber can be allowed to stand, with both large timber and branches stacked to create microhabitats and smaller branches and leaves swept into brush piles.

RSPB



Osprey (*Pandion Haliaeetus*)

Ospreys are found in forests and stands of Scot's Pine, usually beside a loch. Although invariably associated with the wilds of Scotland, their favoured habitats are commonly found on many of our golf courses and they are becoming more widely seen.

On their return from Africa, these striking birds lay their eggs in late April. Although their population is increasing overall and the return of the species can be looked upon as a success story, they are continually under threat from egg collectors, poisoned bait and habitat loss.

Ospreys look for fish, their sole food source, by hovering over water, or by utilising a nearby perch.

Grassland Management

Areas of grassland roughs provide valuable habitat corridors; they should be linked both internally and outwith the golf course environs. Grassland offers excellent water retention opportunities as well as having the ability to prevent soil erosion. Control and eradication of invasive species such as bracken is essential. However, once bracken is under control a limited amount is beneficial for a variety of invertebrates. Areas of rough grassland can be managed to provide excellent wildlife habitats, together with buffer strips for water features, ditches and other sensitive areas.

Rough grassland only requires annual maintenance such as one cut and rake in September. This lowers maintenance costs, especially if the area can also be kept free of chemical applications or drift spray and the depositing of grass cuttings.

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Northern Marsh Orchid (*Dactylohiza Purpurella*)

Found in marsh grassland areas, these orchids are a characteristic deep purple colour with beautiful diamond-shaped petals and dark markings.

Where wildflower populations are identified and finer native grasses such as Red Fescue *Festuca rubra* and Creeping Bent *Agrostis stolonifera* are identified special care should be taken to conserve these sensitive species. If they are already in situ it is generally a sign of good management practice.

Grasslands can also be made more visually interesting and diverse with the addition of native wildflower seed mixes or native wildflower plugs. Such planting will encourage a wide range of butterflies and moths, which in turn will attract many species of birds and bats. Careful planting and maintenance of gorse and broom will not only add visual stimulus, but can be very valuable bird and invertebrate habitats in themselves if they adjoin rough grassland.

Ponds and Wetlands

Ponds and wetlands can be particularly aesthetically pleasing areas on golf courses. However, the long-term management outlay of such features is sometimes forgotten at great cost to the wildlife and the golfer. Management of existing ponds and wetlands, together with the creation of new ponds and wetlands encourages a wide diversity of wildlife, creates an ecologically sound system and provides course drainage and, in some cases, primary water treatment.

Wetlands offer a tremendous range of plants such as Common Reedmace *Typha latifolia* and Hare's Tail Cotton Sedge *Eriophorum vaginatum*. However, these areas need to be protected from chemical applications and drift spray so that aquatic plants and wildlife remain unharmed.

Under Local Environment Risk Assessments for Pesticides (LERAP) six metre buffer zones have been set for some pesticides. However, this can be reduced to one metre when using LERAP-tested and approved spray jets. In addition, under the Groundwater Regulations golf courses cannot flush sprayer washings down the drain or onto waste ground. The homogenous cover of a plant type is usually an indicator of chemical application or spray drift. In nutrient-rich waters for example, Common Duckweed *Lemna minor* and Canadian Waterweed *Elodea canadensis* are highly invasive species. Where over-nutrication (eutrophication) occurs algal bloom can be present.

Heathland

Heaths are characterised by nutrient poor acid soils principally consisting of the heath (Ericaceae) family. Heather or Ling *Calluna vulgaris* is usually the most prominent species, although the Vaccinium species, for instance Blaeberry and Cowberry, become more important on the upland heaths.

On lowland heaths Ling *Calluna vulgaris*, Bell heather *Erica cinerea* and Cross-leaved heath *Erica tetralix* combine with gorse and grasses to provide a mixed habitat, which like the upland heaths, is sensitive to a number of factors.

This vulnerable habitat can be home to a number of game birds that rely on a variation in the age of the heather cover for nesting and feeding. These game birds include Red grouse, Capercaillie and Black grouse, as well as Pheasant, alongside a considerable array of invertebrates such as moths, grasshoppers, crickets and dragonflies.

Changes in golf course management can rapidly benefit the heathland in terms of its health and diversity with benefits arising beyond its high biodiversity value. The heath's slow growth pattern enables general maintenance costs to be kept low in comparison to woodland and grasslands.

Many different management options can help regenerate heather, including restricted burning, scarification, seeding and turfing. Such options for golf courses are dependent on a number of localised factors - climate, land use, viable seed bank and budgets - to name but a few.

Dunes

Sand dunes are extremely fragile habitats sensitive to changes brought about by erosion, pollution and development. Dunes are formed through natural processes with formation triggered by obstacles to the wind (including tidal litter and vegetation) which slows the wind and allows the deposition of sand. Vegetation is probably the most important in terms of dune stability, but it is also the most susceptible to damage from movement and trampling.

Links courses derive their name from the Scottish word 'links' meaning 'undulating sandy ground near the coast'. These courses have a clear role to play in possible preventative measures for coastal erosion. As part of this process the conservation of native plants and careful utilisation of chemical sprays will need to be considered.

Dunes are home to more than a thousand species of flowering plants and ferns, as well as hundreds of species of lichens, fungi and algae. These support a diverse range of invertebrates such as butterflies (including the Small pearl-bordered fritillary), bumblebees, grasshoppers, spiders and beetles. Birds of prey (Short-eared owls and Merlins) hunt the dunes and slacks, whilst Fieldfares and Redwings winter among sea buckthorn where they feed on the berries. The dune system on the Angus Coast, which includes a number of golf courses, features many of these species.

ECOLOGY AND MANAGEMENT

Case Studies

North Inch Golf Club, Perth

The recent redevelopment and extension of the North Inch Course led to an opportunity to develop “natural areas”, which will also enhance the players’ enjoyment. Owing to its restricted area it was determined that the woodland and water features on the course would need to play many roles.

With this in mind the Scottish Golf Course Wildlife Group carried out an assessment of the current landscape, the course, its future developments and improvements. It was decided to split the course in terms of landscape type. Parts of the course are set in parkland and these have had supplementary planting of Oak and Lime trees. Other areas have ‘gone native’ with plantings of local tree and hedge species. This defines the course fringes. The south bank of the Tay has been planted with species reflecting those on the north bank.

In the wetter areas Willow and Alder trees have been used to create a semi-natural wetland habitat. It has been designed to demonstrate the mutual benefits to both golfer and wildlife. The course has also had areas of rough ‘grown in’ to create better definition and - importantly, to provide a challenge to golfers, as well as introduce further habitats.

The planting schemes were co-ordinated by Perth and Kinross Council Tree and Woodland Officers.

Gleneagles Golf Courses

Since 1983 Gleneagles Golf Courses have been developing environmental practices that enhance the resort’s five star reputation. To date this has culminated in the ‘Committed to Green’ Pan-European Golf Environment Award.

Baseline information was gathered on the geology and history of the landscape. The conservation works first and foremost revolved around the management of the eighteen Sites of Scientific Interest (SSIs) and one Site of Special Scientific Interest (SSSI), but they also made many of the wetland areas a feature of the new Monarch’s (now Centenary) Course which was developed in 1992.

The international journal “Golf World” stated in June 2000 ‘when nature and golf collide harmoniously, as they do in the marsh in the front of the 5th green, the hole becomes naturally more exciting to play’.

In 1992 the first Gleneagles Golf Courses’ Integrated Ecological Management Plan 1992 – 1997 was produced which set out the objectives for the coming five years. In 1998 the plan was reviewed and replaced with the Gleneagles Golf Courses ‘Environmental Management Plan 1998 – 2002’.



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CURRENT FACTORS CAUSING LOSS OR DECLINE**Changes in plant diversity**

Within the last twenty-five years there have been significant declines in plant species diversity in moorland grass, infertile grassland, tall grass/herb and lowland wooded habitats. Conversely there was an increase in species diversity in heath/bog vegetation.

Decreases in the average number of species have occurred in fields, woods, moorland, hedges and riparian edges, especially in lowland landscapes. The changes in the different types of plants suggest that the decline reflects an overall shift towards more intensively managed and nutrient-rich vegetation. The increase in diversity in heath/bog vegetation was associated with an increase in grasses at the expense of typical heath and bog plants.

Native species at risk

Whilst many native species are relatively common over a quarter of fish, amphibians and reptiles assessed in 1997 are considered “threatened”. Between 10 and 20 per cent of invertebrates, vascular plants and lower plants (lichens and mosses) are “threatened”, with a similar proportion designated “nationally scarce”.

Comparable figures are not available for mammals and birds because their threat status is considered in the international rather than the national context. A large proportion of invertebrates, plants, and other organisms (for example parasitic animals, springtails, fungi, and micro-algae) has not been assessed and so is not included.

MAIN THREATS TO KEY SPECIES

Otter	Poor spraying practices and lack of buffer zones, plus pollution of watercourses. Impoverished bankside habitat features needed for breeding and resting. Incidental mortality, primarily by road deaths.	
	UK importance of Tayside population:	moderate
Capercaillie	Loss of heath/ pinewood habitat due to inappropriate management, including use of fertilisers and pesticides, over-watering, excessive foot and cart traffic, burning and lack of invasive species control.	
	UK importance of Tayside population:	high
Black Grouse	Inappropriate management of heathland, including use of fertilisers and pesticides, over-watering, excessive foot and cart traffic, burning and lack of invasive species control. Habitat fragmentation leads to isolated populations. Collisions with deer fences. Loss of under-storey food plants in mature conifer plantations.	
	UK Importance of Tayside population:	high
Short-eared owls	Inappropriate habitat management, including poor spraying practices. Excessive trampling. Loss of sand dune habitat.	
	UK Importance of Tayside population:	moderate

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Fieldfares, Redwings and other migrants	Loss of sand dune complexes owing to lack of shrub species such as buckthorn and inappropriate habitat management (poor spraying practices). Excessive trampling.	
	UK Importance of Tayside population:	small
Amphibians, including Frog, Toad and Newts	Poor spraying practices. Lack of buffer zones. Loss or poor management of ponds and pools.	
	UK Importance of Tayside population:	moderate
Native Tree Species (including Ash, Oak, Alder, Elder, Hazel, Aspen, Willow, Hawthorn, Scots Pine, Bird Cherry, Gean (Wild Cherry), Holly, Wych Elm, Rowan, Juniper, Birch and Yew)	Poor selection and inappropriate plantings of trees on golf courses leading to loss of other habitats of equal importance. Poor tree management through inappropriate use of strimmers and staking leading to a high loss of existing and newly planted trees. Removal of hedges and treelines leading to loss of 'wildlife corridors'. Removal, or inappropriate management, of mature trees or copses leading to habitat loss. Loss of diversity of habitat through removal of standing dead wood or log piles.	
	UK Importance of Tayside population:	moderate
Cowslip	Poor rough grassland management, including use of fertilisers and pesticides leading to a loss of native grasses and wildflower populations. Lack of invasive species control.	
	UK Importance of Tayside population:	moderate
Ragged Robin	Poor rough grassland management, including use of fertilisers and pesticides leading to a loss of native grasses and wildflower populations. Loss of wetland habitat. Lack of invasive species control.	
	UK Importance of Tayside population:	moderate

OPPORTUNITIES AND CURRENT ACTION

Scottish Golf Environment Group

The Scottish Golf Course Wildlife Group, established in 1992, is a partnership of golfing and environmental organisations from the public, private and voluntary sectors. It employs two full time golf course advisers who aim to:

- Raise awareness of the existing and potential environmental value of golf courses;
- Promote best practice management and development of golf courses for the benefit of golf and the environment;
- Establish mechanisms for proactive adoption of best environmental practices.

They do this through:

- Increasing the application of best environmental practices in golf course management;
- Improving knowledge and understanding of environmental issues and how they affect golf course management and development;
- Promoting golfing and environmental issues to relevant organisations and involving them in the delivery of the Group's aims and objectives;
- Enhancing the environmental contribution of new golf course developments by offering guidance on best practice.

OBJECTIVES & TARGETS

	Objectives	Targets
1	Raise awareness in Golf Clubs of the benefits of biodiversity.	<p>Work with the Scottish Environment Protection Agency (SEPA) and Scottish Natural Heritage (SNH) locally to raise awareness of the benefits of good environmental practices.</p> <p>Provide a list of relevant native tree species for Tayside golf courses, with suppliers and prices.</p> <p>Produce a database of support organisations and suppliers whose goods and services would be of benefit to golf courses.</p> <p>Devise training programmes/seminars in partnership specifically for greenkeepers in order to raise awareness of biodiversity on golf courses.</p>
2	Raise public awareness of the benefits of biodiversity on golf courses.	<p>In conjunction with Scottish Enterprise Tayside, Tourist Boards, Scottish Golf Course Wildlife Group, retail outlets and accommodation providers show the general public the links between golf courses and biodiversity.</p>
3	Promote the Scottish Golf Environment Group Environmental Excellence Awards and the associated benefits.	<p>Scottish Golf Environment Group have set a target of 20 courses to be actively involved in the Local Biodiversity Action Plan process by April 2005.</p> <p>The Scottish Golf Environment Group have set a target of 40 courses to be fully recognised in the Environmental Excellence Awards by April 2005.</p>
4	Protect and enhance biodiversity on golf courses. Tayside.	<p>Audit the biodiversity golf course resource in</p> <p>Set up a standard recording mechanism for flora and fauna on Tayside golf courses.</p> <p>Implement practical pilot project to protect and enhance biodiversity on golf courses.</p>

Golf Courses

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Stakeholders

- Golf Club Boards;
- Golf Club Members;
- Golf Course Managers;
- Greenkeepers;
- Regulatory Bodies;
- Voluntary Sector Organisations;
- Members of the public;
- Suppliers;
- Universities and Colleges;
- Local Authorities;
- Golf retail outlets;
- Tourist Boards;
- Accommodation providers;
- Enterprise companies.

ACTION FOR BIODIVERSITY

		Action - Golf Courses Action Plan	Deliverers		To take place by								Meets Objective No.
			Lead Partners	Partners	02	03	04	05	06	07	11	16	
LBAP Ref.	A	Policy and legislation											
UBE3	I	In partnership with SEPA and SNH raise awareness of golf courses' legal responsibilities. i. 2004 - select areas of concern and improvement. ii. 2005 - Devise awareness raising media. iii. 2006 - circulate publication. iv. By 2007 - Monitor breaches of compliance against 2002 level.	SEPA	SNH AC DCC PKC			#	#	#	#	#	#	
	B	Site safeguard and management											
UBE3	I	Devise in consultation with golf clubs practical projects that would be of benefit to both the golf clubs and biodiversity; encourage Best Practice demonstration sites and Open Day visits.	SGCWG	SNH SEPA TBP Selected golf clubs			#	#	#	#	#	#	
	C	Species management and protection											
UBE3													
	D	Advisory											
UBE3	I	Produce a database of support organisations and products which will protect and enhance biodiversity on golf courses - by 2004 (include provision of database training from 2005 if required).	SGCWG	SNH AC DCC PKC Selected organisations & golf clubs			#	#					

E		Research and monitoring				
UBE3	1	Identify existing recording systems, trial recording systems, audit specific golf courses and adjust specifically for golf course use. By 2007 assess results from three selected golf clubs and roll out system to all Tayside Clubs by 2011.	SWT	SGCWG SNH Selected golf clubs TBP	# #	
F		Promotion and awareness-raising				
UBE3	1	Devise regular training programmes/seminars in partnership, if required, specifically for greenkeepers.	SGCWG	Selected golf clubs, Universities and Colleges TBP	# # #	
UBE3	2	In conjunction with partners develop and promote innovative marketing ideas to raise the profile of biodiversity on golf courses.	SET TBP	ATBs SGCWG Retail Outlets	# # # # # # #	
UBE3	3	Plan Monitoring – monitor the delivery of the Action Plan yearly and review it in detail every 5 years, starting in 2003.	TBP		# # # # # # #	

Golf Courses

This illustrative map shows a few key examples of the habitat. Please note that many sites of interest are privately owned and owners' permission should be sought for any access.

