



Fact Sheet: Biodiversity on Golf Courses



The loss of biodiversity, alongside climate change, is currently one of the largest and most important challenges. It is believed that the current rate of species extinction, due to human influences, is up to 1,000 times higher than the natural extinction rate. Many of the vital resources and services, which are underpinned by biodiversity, are provided to us by ecosystems that are at risk.

Companies use these ecosystem services and natural resources in various forms and thereby have a large impact on nature. Therefore, even by just considering economic reasons, companies depend on the conservation of biodiversity and a steady decline in biological diversity can become a risk for many businesses in the future. At the same time, a proactive approach to conserve biodiversity can create new business opportunities.

Golf courses require large areas of land. Their size varies from 25ha to 100ha or more (depending on a 9-hole or 27-hole course).

The development or expansion of golf courses is still seen critically by nature conservation organisations, although well-planned and managed golf courses which are set in a large, homogeneous agricultural landscape could be retreats for animals and plants. Managers of golf courses have several direct and indirect possibilities to reduce their negative effects on biodiversity and support its conservation.

Negative Impacts on Biodiversity

Scientists from all over the world agree that the main causes of the loss of biodiversity are:

- Degradation and destruction of ecosystems
- Overexploitation of natural resources
- Climate change
- Emissions/Pollution
- Invasive alien species

Whereas the reduction of emissions is a „traditional goal“ of environmental management systems and climate change is increasingly taken into consideration via the reduction of energy consumption and greenhouse gases, other aspects are rarely considered. Therefore, this fact sheet places special emphasis on the degradation of ecosystems, overexploitation of natural resources and invasive alien species and describes direct and indirect opportunities for companies to take these aspects into account.

The appendix of this fact sheet contains references to additional relevant information. Furthermore, a similar fact sheet for the tourism sector is available that contains useful information and advice which can also be interesting for golf courses.

Strategy/Management

The management provides the framework for continuous improvement of the company's biodiversity performance. Businesses and environmental auditors should try to answer the following questions:

- *Is there any person responsible for biodiversity/species protection/nature conservation issues?*
- *Has the company systematically evaluated direct and indirect impacts on biodiversity?*
- *Does the company's environmental or sustainability programme include biodiversity targets and actions?*
- *Does the environmental or sustainability programme include biodiversity targets and measures?*
- *Are the targets and actions also time-limited, achievable, verifiable and measurable?*
- *Does a monitoring system exist, underpinned with significant key data and indicators?*
- *Does the training programme for employees include biodiversity aspects?*
- *Is the company engaged in a local, national or European business and biodiversity initiative?*
- *Is there a strategy in place to involve local initiatives?*

How many questions can your company answer with yes? Of course, a yes tells us nothing about the quality of the strategy or measure. Nevertheless, these findings are an important first step and show the need for action, in other words useful measures for the benefit of the company.

Examples: Indicators for Strategy/Management:

- *Number of employees trained in biodiversity conservation issues*
- *Number of employees taking part in biodiversity volunteering activities*

Stakeholders

The successful integration of different stakeholders is important: in many regions golf still has the image of an elitist luxury sport, which uses an inadequate high amount of land and causes considerable environmental impacts. A well-planned involvement of external stakeholders can reduce conflicts and potentially increases the acceptability of new golf courses among residents and in the whole region.

Scientific institutions, nature conservation authorities or environmental organisations provide expertise on biodiversity. Assistance in biodiversity monitoring provided by local NGOs should be adequately remunerated. With regard to EMAS, according to annex II.B5, involvement of stakeholders is necessary. To facilitate good and specific involvement, adequate structures must be created. Existing participation structures including transparent handling of stakeholder enquiries are therefore also considered as biodiversity indicators.

Questions golf course operators should consider:

- *Stakeholder-mapping: Has an analysis of stakeholders as well as their potential contribution to improve the company's biodiversity performance been implemented?*
- *Stakeholder-dialogue: Are there transparent structures including clear structures for handling complaints in place?*
- *Have stakeholders been involved in developing the mission statement of the golf course?*
- *Are stakeholders continuously informed about the implementation of the mission statement or the sustainability programme?*
- *Is there a concept in place, which allows local people to enjoy the natural environment of the golf course?*

Premises and Properties

Because of the large area, the design and maintenance of green spaces will play an important role in the environmental management system of golf courses. Since golf courses require intensive care and maintenance, environmental aspects such as the use of fertilizers, pesticides, water and energy have to be taken into consideration.

Questions golf course operators should consider:

- *Does the environmental policy contain objectives regarding positive effects on the local biodiversity which go beyond legal requirements?*
- *Has information on the local ecological situation been included in the biotope concept?*
- *Is there a biotope development plan in place? Were the functions of different areas e.g. ecological core zones, buffer areas, development zones, ecological corridors, bridges etc. determined? Does the maintenance team know these functions adequately? Are “biotope characteristics” including maintenance instructions available?*
- *Were indicators of key species defined for the monitoring?*
- *Is the maintenance team able to identify the main types of invasive alien species and are they instructed to report their occurrence?*
- *Is there a constant monitoring of the development of the area (e.g. counting of indicator and key species)?*

Greens, fairways, teeing ground and roughs do not contribute to the conservation of biological diversity – on the contrary, they pose a serious problem for the local biodiversity: on the one hand because these areas constitute barriers and no protection for animals as they that are often frequented by humans, on the other hand due to the used substrate fertilizers, growth regulators and pesticides are quickly washed out.

Because of the extensive care and the rare disturbances by players, hard roughs can be areas with a higher biodiversity than the surrounding area. Depending on the local conditions, they can be the perfect areas for biodiversity-rich habitats, such as natural grassland, extensive and ruderal habitats, ponds (that are allowed to dry up in summer), heathland or even peat lands.

Elements which enhance the sporty appeal of the golf course, such as water hazards, can also be designed to be more natural. For this purpose, the playing field should not be placed too close to the bank which should have a low grade and host at least natural vegetation on a part of it, and provide a resting area for animals on one side of the water hazard. In this way, reed habitats can develop which can be used as breeding grounds by aquatic birds.

Pesticides, Fertilizers and other Chemicals

In line with the EU strategy on the sustainable use of pesticides, it should always be the aim to avoid the use of pesticides, fertilizers, or other chemicals such as growth regulators on the golf course. At least, this should be possible for the hard-roughs.

The use of appropriate sprayers and spreaders, proof of expertise in matters related to the use of chemicals in natural areas, documentation of the use of chemicals in a so-called spray diary, and the proper storage of chemicals are legally prescribed in countries such as Germany.

In the context of environmental management, the public should be regularly informed about the use of fertilizers, pesticides and other chemicals. In addition, there should be clear guidelines for the use which describe what, when and how pesticides and other chemicals are applied.

The maintenance team should regularly think about alternatives to the use of pesticides, herbicides and biocides, and should test them on the golf course on specially prepared test areas. For example, it is possible to increase the resistance of grasses by choosing the right grass varieties, adjusting the pH-value, aeration or appropriate fertilization. In addition, the possibility of biological pest control should always be considered and tested. Information on alternatives can be found at: www.beyondpesticides.org/golf. An overview about this and more greenkeeping principles can be found in the publication of the Scottish Golf Environment Group on Turf Management. To download at:

<http://www.sgeg.org.uk/documents/Advice/Turf/Key%20contents%20of%20a%20Sustainable%20Turf%20Management%20Policy%20%28SGEG%202010%29.pdf>

The effects of climate change will have an ever bigger effect on the maintenance of the facility and the use of chemicals: in the future, grass varieties have to withstand heavy rainfall and intense heat and dry periods more than ever before. Green keepers, who do not observe these changes, also risk increased pest and disease infestations of plants which are weakened by extreme weather events; this in turn may cause a higher pesticide use.

Recommended measures for the handling of pesticides:

- *Establishment of test areas for alternative pest control and alternative methods to increase the resistance of greens, tees and fairways. Participation in research and demonstration projects for biological pest control.*
- *Setting an infestation limit- for players acceptable - below which no pests control will take place. Only the least toxic and most specific substances should be used in the minimum necessary amounts.*
- *Publication of the quantities of resources used in kg/ha broken down by area (teeing ground, greens, fairways).*
- *Regular review of the impact of the effluent surface water. Identification and elimination of pollution sources.*
- *Pesticide drift should be avoided. Pesticides should be used following the specified advice of the manufacturer and under the right weather conditions, while complying with the minimum distances to natural areas and water bodies.*

Irrigation and drainage

With the expected increase in extreme events (droughts and torrential rain) in the wake of climate change, the proper use of water is becoming increasingly important. With respect to biological diversity it is important to note that excessive irrigation promotes lawn diseases. A precisely metered irrigation contributes to a reduction in pesticides use and to the conservation of biological diversity.

In addition to the good technical condition of the irrigation system (e.g. high uniformity in water distribution), it is important that the exact water requirements and irrigation timing are not only determined on the basis of visual appearance of lawns. Depending on the varieties which are used, the lawn responds differently to heat and drought. A brownish-looking lawn can be a normal reaction of the plants and completely harmless to the lawn. In the before mentioned guide the use of moisture sensors to control the irrigation is therefore recommended. In this way, a deeply developed root system can be reached, whereby water will also be saved. Extensive information of the use of water on golf courses contains the brochure of the German Golf Association: "*Bewässerung von Golfanlagen - Schonender Umgang mit Wasser*" (in German only).

An increase in the intensity of rain in the future as a result of climate change requires the implementation of measures to divert high rainfall quickly away from playing field. This offers the possibility to create pools rich of biodiversity that catch the rainfall and dry up in summer. Case studies and examples of sustainable drainage can be found on the homepage of the "Scottish Golf Environment Group" <http://www.sgeg.org.uk/publications.htm>.

When using water from rain detention basins that have been created as ecological valuable ponds, the water level should not fluctuate too much (i.e. less than 20 cm). Only then the existing fauna and flora can cope with the fluctuation.

Invasive alien species

Invasive alien species can replace native plants and animals and therefore contribute to the loss of biodiversity. The locust tree (*Robinia pseudoacacia*) for example migrates to semi-dry grasslands and accumulates nitrogen in the soil, this causes more species which favour such an environment, and finally displaces the natural vegetation of the semi-dry grassland. Basically, only native plant species should be used in the design of the green. They are a food source for birds, insects and small mammals, and adapted to the climatic conditions (which also lowers the maintenance costs). Exotic species that are planted on unnatural surfaces due to their attractiveness may not have a chance to spread by itself.

Also animals, such as the argentine ant, can cause significant environmental damage to the ecological balance.



Robinia pseudoacacia

To combat invasive species, they must first be detected by employees. For this purpose special information is necessary. Information about major invasive species in Europe can be found on <http://easin.jrc.ec.europa.eu/About/Online-resources>. Golf course operators should make a list of the most invasive species in the region and train their employees to recognise these plants and immediately notify them. Together with the nature conservation authority and/or NGOs a plan to combat alien species should be developed and implemented.

Stock-taking and biotope concept

In order to develop a comprehensive concept for the protection of biodiversity on the golf course, it must be clarified which biotope types and species should be preserved to exploit the ecological potential of the area.

Landscape conservation support plans, landscape plans and other plans at the regional or local level provide necessary information. Natural and environmental associations usually are well informed about the local conditions. In particular, if the golf course is close to a nature reserve, there should be detailed information about the ecological conditions. This information determines the development of

certain biotope types and describes the landscape in which the golf course should blend in. With this information it is also possible to locate indicator species which should be promoted on the site.

Surface Features

Even habitats with the highest quality are of no avail for animals and plants, if they occur as single isolated islands in the landscape. For this reason it is important to develop a concept that connects biotope types apart from the clear care goals and care for the individual biotope types. The aim should be a biotope system that consists of core areas and buffer zones, respectively whole and partial habitats.

An important step to achieve this is to define surface features that exhibit different requirements: (ecological) core areas should have an appropriate size (1 ha at 50m width). Depending on site conditions, the core areas should be surrounded by buffer zones which, for instance, prevent the nutrient contamination of nearby agriculture. The general aim should be the prevention of biotopes from becoming disaggregated, and where this process already has occurred – create safety for the local biodiversity by necessary connections.

Aims, Measures and Monitoring

An established method to identify and monitor protection goals is the determination of target or indicator species. Target species are most in need of conservation efforts, indicator species are characteristic for a biotope type. The advantage is that their appearance makes it easy to plan and measure the effects of actions. First, this will allow to describe the necessary requirements for a habitat precisely, so that the appropriate measures for appropriate living conditions follow from this. Second, the target or indicator species allow pragmatically the control of success, because of its settlement you can see that the action was successful, without having to collect all the plants and animals that have settled here.

In determining the measures it should also be remembered that, for example, the successful settlement of amphibians may have consequences for the operation: during the migration times of amphibians harvest times consequently have to be adapted, so that the animals do not get into the cutting unit.

External expertise and staff training

It is advisable to consult external experts. This includes professional consultancies or experts of conservation organisations who regularly check the development of the ecological network in terms of its functionality, and consequentially could suggest necessary adjustments. For a lasting positive effect, local employees who take care of the area and implement the measures are crucial. The green keepers and landscape gardeners will first notice when a habitat is out of balance or alien species are settling. This requires specific knowledge. The technical skills that are needed to care for a green are not identical with the necessary expertise you need to plant and maintain an ecologically valuable

area. Employee training should be an important part of the environmental management system. It must be ensured that seasonal workers have the necessary skills and are trained in the proper care of the biotopes.

Indicators and indices of the operating area:

- *Value of the area in eco-points (according to regional valuation system)*
- *Percentage of ecologically degraded areas such as green, tees, fairways, sealed surfaces, etc. compared to the total area of the company (in %)*
- *Number of high-value biotopes, which are connected to one another*
- *Occurrence, population sizes of target and indicator species*
- *Number of invasive species on the area and the number of conducted control measures*
- *Number of employees with extensive knowledge of environmental and landscape conservation*
- *Existence of "biotope characteristics" with care instructions (yes/no)*
- *Used pesticides broken down by Rough/Fairways/Greens (number, liters per hectare)*
- *Use of alternative methods for controlling pests, diseases and weeds, or to increasing the resistance of the area (yes/no)*

Procurement/Supply Chain

The procurement or supply chain has indirect effects on biodiversity. The list of products and services is an important first step is to analyse the impact of key products and services on biodiversity.

Although the integration of biodiversity issues varies from label to label, awards such as the FSC, EU Eco label or fair trade labels are a good starting point. The underlying criteria of such labels usually contribute to the protection of biodiversity, for example they regulate the use of pesticides or prevent the overexploitation of stocks. Some measures that the company should take:

Sanitary: use of products with an official eco-label for cleaning and especially sanitation. Ecological cleaning products made from pure vegetable materials which are 100% bio-degradable, protect the water and thus the biodiversity in the aquatic environment. The sanitary facilities are used by many guests and the hygienic requirements increase with the frequency of use. Often a disproportionately high demand of chemicals and chemical disinfectants is used. This is costly, health burden for cleaning staff and guests, and ultimately unnecessary. This results in unnecessary and avoidable costs and health hazards for cleaning staff and guests.

Restaurant: local organic food should be first choice. For all products that cannot be produced in the region, e.g. coffee, tea, cocoa, rice, chocolate, fair trade certified products are a good alternative. For fish products the label of the Marine Stewardship Council (MSC) is representative.

Biodiversity also includes old crops and livestock. Farmers that contribute to the preservation of old grain or vegetables or traditional livestock breeds, should be supported. If the restaurant offers ancient grains the company contributes to the conservation of biological diversity - and creates also a USP (unique selling proposition) as well as points for a communication with the guests.

Products and services that violate any laws or regulations (e.g. food as shark fin soup) should be **immediately delisted and not be tolerated**.

Shop for golf accessories: the destruction of ecosystems and overuse of natural resources also play a role here. Clothing that is made from 100% organic & fair trade cotton has significantly lower negative influence than the conventional cotton. In conventional cotton production 25% of insecticides and 11% of all pesticides which are used worldwide can be found, although the whole global agricultural area of cotton is only 2.4% of the total global agricultural land.

These are just some examples to emphasise that all essential products must be analysed. The golf course operator should use all of its influences e.g. inquiries or specific requests to manufacturers of golf accessories - together with other golf courses or even better as an association.

Indicators and key data for the supply chain:

- *Proportion of organic dishes on the menu*
- *Proportion of products with organic certification*
- *Proportion of seasonal dishes*

Product design/final product

Design golf courses and landscaping courses differ in their basic design philosophy and therefore in the possibilities to promote biodiversity. For a landscaping golf course it would be easier to create natural and species-rich areas in the square itself. Nevertheless, a design golf course, which more or less unconditionally subordinates the needs of the players, can hold the bottom line on the aim to have a positive impact on biodiversity. If this is locally not possible - on the golf course itself - it should be brood on compensation in the region. The obligations imposed by the impact regulation under nature protection law on the user, represent only the minimum users be bounded to anyway. The easiest way for compensation is to purchase additional eco-points – without using this point for intervention itself!

Example for indicator and index:

- *Value of the area in eco-points (according to regional valuation system)*

Marketing/Communication

Golf courses can benefit from their biodiversity commitments: intact biotopes on the area increase the value of the whole golf course. In any case, it is important to communicate the biodiversity commitment of the golf course operator. On the one hand, this creates a positive public image; on the other hand, it is also a contribution to the conservation of biological diversity and the consumer sensitisation. The company has the function of a role model for competitors. Many companies fear that their commitment could be seen as greenwashing. To avoid the impression of greenwashing, a balanced and realistic representation of the successes and the activities is necessary. On www.sevensins.org companies find extensive information on what they should avoid in communication. For example, it should be clear that it is not sincere to celebrate the installation of a small pond for rare amphibians when, at the same time, surfaces are sealed simultaneously on a large scale. The environmental management provides support: if the impacts of the golf course on biodiversity were recorded and measures to protect biodiversity have been set, an appropriate representation ensues by itself. A successful integration of biodiversity into environmental management opens up new and attractive opportunities of marketing and public image.

Useful Measures and Indicators for Marketing/Communication:

- *Biodiversity conservation activities involving golfers (number of activities, quality of objectives, measures and results)*
- *Fulfilment of GRI criteria for sustainability reporting*
- *Active involvement of stakeholders (e.g. nature conservation organisations) in environmental resp. sustainability reporting (number and quality of involvement)*
- *Biodiversity as a media communication issue (number of press releases and/or press trips, number of journalist s involved...)*
- *Information for club members about the natural environment of the golf course: Existing plant and animal species, habitats and their function*
- *Information about biodiversity on web pages, flyer; presentation of the biotope concept and nature tours on the golf course*
- *Implementation of a Biodiversity day/Week with charity activities, organic food etc.*
- *Sponsorship of a threatened animal or plant species in the region by supporting a project of the local/regional conservation organisation. Motivation of other companies in the community region to support the project as well.*

Legal Compliance

Legal compliance in the field of environment is an important element of EMAS validation. ISO 14001 also demands the organisation to evaluate its compliance with legal requirements (§ 5.2.). Businesses across all sectors should be aware of laws and regulations relevant to biodiversity conservation.

These are primarily nature conservation acts such as the Birds and Habitats Directives at European level and its corresponding nature conservation act at national level. Of course, environmental legislation is also relevant to biodiversity conservation. Particularly important for businesses is the Environmental Liability Directive (ELD). An overview of the European and international nature conservation legislation is available at: <http://www.business-biodiversity.eu/legal-framework>

Useful Measures and Key Data Key Data/Indicators for Legal Compliance:

- *The company has an overview of the current legislation relevant to biodiversity. Employees are informed about relevant laws and regulations and have access to legal texts (collections of laws, access of the employees to legal database yes/no)*
- *Training of employees in the case of new legislation and amendments (number of qualified employees)*
- *The company requires from all suppliers/service providers a declaration that environmental and nature conservation legislation are respected (number of suppliers/service providers who have signed this declaration)*
- *Continuous increase in the number of suppliers/service providers holders of environmental management certification (percentage of the total number)*
- *Training of suppliers/service providers in legislation relevant to biodiversity (percentage of qualified suppliers and service providers)*

Links and Publications

Sustainability Standards and Management of Golf Courses

The standard "Eco-sustainable golf course" has been created to support the management of green spaces of golf courses in the framework of sustainable development principles (ecological, economic and social aspects).

<http://www.ecocert.com/en/eco-sustainable-golf-course>

The web portal of the Scottish Golf Environment Group contains information on key issues relating to sustainable golf facility management. In this section you will find a range of downloadable guidance which will assist you in your efforts to tackle environmental management of golf facilities.

<http://www.sgeg.org.uk/advice.html>

The Dutch Consultancy Between-us started an in-depth benchmark analysis of sustainability at international top golf tournaments: The Sustainable Golf Index

<http://www.between-us.com/562/the-sustainable-golf-index.htm>

Use of water on golf courses of the German Golf Association: "Bewässerung von Golfanlagen - Schonender Umgang mit Wasser" (Brochure in German only).

Corporate Biodiversity Management Tools and Initiatives

The Corporate Biodiversity Management Handbook is published by Biodiversity in Good Company/CSM

<http://www.business-and-biodiversity.de/en/activities/biodiversity-management/handbook>

"Eco4Biz - Ecosystem services and biodiversity tools to support business decision-making" is a structured overview of existing tools and approaches published by the World Business Council for Sustainable Development

<http://www.wbcsd.org/eco4biz2013.aspx>

European Business and Biodiversity Campaign with current events, best practice examples and a knowledge base:

www.business-biodiversity.eu

EU Business and Biodiversity Platform

http://ec.europa.eu/environment/biodiversity/business/index_en.html

UN CBD Global Platform on Business and Biodiversity

<http://www.cbd.int/en/business/home>

More helpful links

Fact Sheet Tourism and Biodiversity

<http://www.business-biodiversity.eu/default.asp?Lang=ENG&Menu=211>

Alien Species in Europe

<http://www.europe-aliens.org>

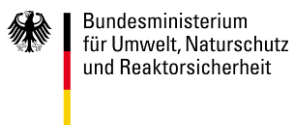
EU-Strategy on the Sustainable Use of Pesticides

<http://ec.europa.eu/environment/ppps/objectives.htm>

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More information: www.business-biodiversity.eu



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