

GOLF COURSE WETLANDS – THEIR IMPORTANCE AND MANAGEMENT

By Mary Purcell

Golf courses are important green spaces to any area, and in many urban sites can be the only green spaces available. They can provide a useful and compatible habitat for humans and nature together. Wetlands are among the most productive and dynamic ecosystems on the earth. They are host to numerous wildlife and plant species. While water ecosystems are of special importance for biological diversity.

Every species has specific habitat preferences and golf course managers and greenkeepers can contribute greatly to conservation by providing habitats for local species. Water quality and indeed overall wetland quality can have an effect on the native diversity.

The age of the golf course can be important in determining its value for wildlife, with conservation value of older sites often seen as being greater. But there exists the potential to enhance local biodiversity significantly if appropriate habitats are created and restored on newer courses, which can be more productive than older unmanaged wetlands. Installing ponds and maintaining wetland areas (no matter how small) can add greatly to the diversity of flora and fauna on the course.

Wetlands are key habitats for the conservation of invertebrate animals. For example, many insects depend on water for their larval stages. Invertebrates have an important role in decomposition and recycling of nutrients in wetlands. Created wetlands in the form of ponds and other water hazards can provide habitat for a diverse array of wetland-dependent species, particularly birds. Wetlands provide large amounts of food that attract high volumes of wildlife with many species using them as an important part of their life cycle. They also act as natural sponges that trap and slowly release surface water, rain-water, flood water and ground water. Loss or degradation of wetlands can lead to an increase in flooding, extinction of species and the decline in the water quality of the area. So it is very important to maintain and restore wetland areas on the golf course.

ESTABLISHING WETLANDS

Before trying to enhance wildlife to any degree on any area of the course, it is important to understand the basic needs of wildlife so as to incorporate them into the site. The basic components of any habitat include: Space, Food, Cover, Water

Wetlands can provide all of these components and in my eyes provide the 'complete package!'

Space is provided in terms of the area of the wetland body as well as surrounding areas. Wildlife corridors (connecting fragments of habitats) help to increase species number and diversity. The greater the variety of plant species located in or around a waterbody, the greater the increase in the niches available for colonisation by various wildlife species. Wetlands contain detritus, which is dead vegetation that forms particles of organic matter, supporting a multitude of insects, which in turn support many other wildlife species.

Water birds use wetlands for shelter, protection, resting and nesting sites and feeding. Water availability is the most important factor for wildlife in my opinion, and so maintaining or restoring water features such as lakes, ponds, streams and wetlands should be top priority for greenkeepers looking to increase the nature potential of the course. Many wildlife species depend on wetland areas for survival and there

are also many species that visit wetland areas less frequently but just as importantly, for, say, breeding purposes.

Robust golf course construction can involve the loss of habitats such as wetlands. But with careful planning they can be incorporated into the landscape of courses, adding to their diversity and uniqueness. Designing and restoring golf courses in natural ways such as incorporating wetland areas may determine the survival of wildlife populations and the ecosystem on which they depend.

STRUCTURE

In nearly all ponds and wetlands, certain plants grow in more or less clearly defined 'zones' and particular communities of animals are associated with them. Closest to the shore are the emergent water plants, which grow with their roots in water and stems and leaves in the air. For example, reeds, bulrushes and marsh grasses. There are plants whose stems are below the waterline; the simpler plants including desmids and algae. Beyond this zone, the floating leaved plants reside – for example, the near-shore lily pads and duckweeds (Lemnaceae).

In deeper water, pondweeds (Potamogeton) and freshwater eel-grass (Vallisneria americana) stem upward from the bottom along with submerged liverworts (Bryophytes) and bladderworts (Utricularia). Emergent plants do not usually colonise water deeper than one metre while the totally submerged plants can be found at depths of many metres. Submerged plant forms include species of pondweed (Potamogeton) and water milfoil (Myriophyllum). Examples of emergent plants include common club-rush (Spirus lacustris), mares-tail (Hippuris vulgaris) and bur-reed (Sparganium species).

Slow moving or still waters encourage copious growth of submerged and emergent plants. Many species of waterbirds use golf course ponds. Shoreline vegetation is important for many foraging and nesting birds. Greenkeepers can add a multitude of plants to a waterbody. It is highly recommended that plants natural to the area, sourced locally, be used in building or restoring waterbodies. Over time the natural plants of the area will colonise the site also.



Author Mary Purcell carrying out laboratory analysis into macro invertebrate diversity in newly-installed ponds



Count on it.

'Macrophytes' refers to the large photosynthetic organisms typically rooted in and permanently submerged in water. Aquatic macrophytes include Charophyceae (stoneworts), Bryophyta (the mosses), Pteridophyta (the ferns) and Spermatophyta (seed plants). Macrophytes have importance, especially in shallow waterbodies. They are important sources of energy and play a significant role in the cycling of nutrients and organic matter. They also provide food for herbivores and contribute to detrital food chains. Additionally they act as substrata for algae and invertebrates. Shoreline and emergent plants add cover, food and aesthetics to the golf course and plants also oxygenate waters to decrease algal blooms.

'Macro invertebrates' refers to the larger and readily visible animals without a backbone. Frogs can be a common sight in wetland areas, which are an important part of their habitat, particularly when young, while adults can also live away from the water (in moist woodlands and grassy areas), returning to the pond to breed.

MANAGEMENT

A golf course can produce low environmental impact if managed well. However, good management practice is essential. Sparse vegetation and lack of buffer zones can increase chemical run-off. Improper fertilisation and poorly maintained irrigation systems add to nutrient losses. Informed management of the golf course is important, not only to the look and finance of the course, but also to the survival of healthy waterbodies.

Raised walkways and cart paths over wetlands allow traffic to move from tee to landing area without disrupting the habitat for wetlands located in areas of in-play. Naturalised areas need to be located where possible out of the regular lines of play. No-spray zones (buffer zones) around a pond are important so as to keep nutrient leaching to a minimum. Aquatic plants in wetlands oxygenate water. If waterbodies become excessively nutrient rich it leads to excessive plant growth and consequently eutrophication, causing the growth of algae, which is not desirable. The system can be balanced by allowing broad floating aquatic plants such as lilies to stop the penetration of sunlight (and therefore temperature) to the bottom so reducing excessive plant growth.



Emergent vegetation. Juncus provides a beautiful aesthetic enhancement. Cat tail utilises many nutrients, which might otherwise be available for algal growth. This vegetation in streams or along shore-lines boosts supplies of O₂ for aquatic flora and fauna by reducing the BOD. Maintenance problems associated with wet areas along edges of ponds and so on are ideal for modifications to benefit waterbirds, while at the same time reducing management costs.

WATERBODIES

Ponds lack a strong, continual, unidirectional current and are usually small with specialised biota. Shallow ponds are inhabited right down to the bottom, as the main population of green plants and animals require light. Water is transparent and allows sunshine to penetrate. The movement of water in streams leads to different colonisation compared to stagnant waters of other waterbodies. The addition of a mini waterfall or oxygenation system to increase water movement in ponds leads to an increase in the water oxygen content and so increases diversity – for example, mayflies are found only in oxygen-rich waterbodies.

Fens are wetland systems with permanent high water levels at or just below the surface. They are fed by rain-water and so are acidic in nature. Fens are important for biodiversity. Over the years there has been a loss in fen habitats. If fens occur on a golf course, care should be taken to incorporate them into the site.

'Riparian zones' refers to the shorelines of lakes and ponds, stream corridors and wetlands. The maintenance of riparian vegetation along streams and rivers is critically important to prevent soil erosion, maintain high water quality and provide habitat for riparian specialists.

Wetlands are a crucial part of our ecosystem and an asset to any golf course. Architects, course managers, greenkeepers and golfers all have a vital role in the preservation and restoration of these resources. Water should be carefully and sensitively maintained for wildlife, as it is an essential component of habitats. Not only is it a refuge for countless species, but also adds great aesthetic appeal to the course.

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